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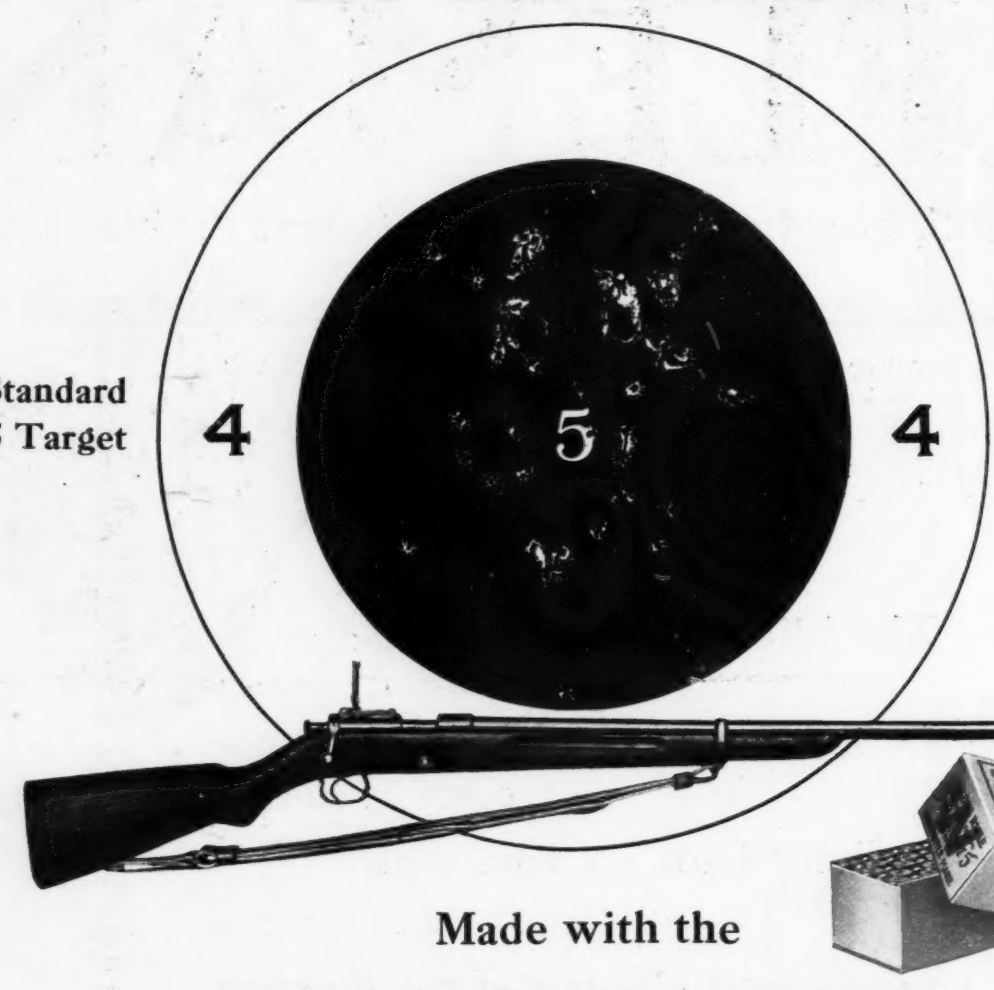

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The Niedner *and the* Grizzly

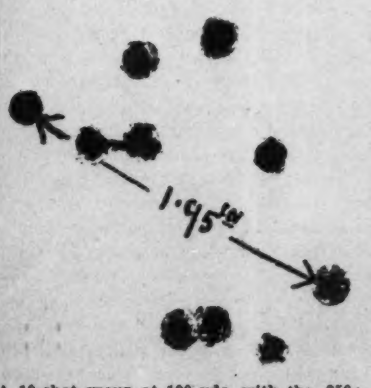
By **F. H. Riggall**

"HUH!" snorted the "old-timer" as he lovingly fondled his smooth-worn old .45-70. "That thar may be all right fer coyotes or sheep 'way off, but whar'll ye be if ye meet up with a big old b'ar with a sore head?"

"That thar" was a beautifully built and finished .25 caliber Niedner-Springfield, the latest addition to my private arsenal and "Ole-timer's" scornful remark merely echoed many, many similar ones uttered by members of the "Coal-burner" clan against each of the crop of small-bore high-velocity rifles which followed the introduction of the 6 m/m Navy and .280 Ross.

Now the writer used a "coal-burner" himself once upon a time, but considerable experience with various small-bores of many makes and types had convinced him that their many advantages far outweighed their defects, so he meekly replied that he would be willing to take a chance with the powerful and superbly accurate Niedner, even with such a bad actor as a big fighting Grizzly on the war-path, but little did he guess then how soon and how thoroughly his bluff was to be called!

The showdown came about as follows: On September 29 last, while hunting along the continental divide between Alberta and British Columbia with Russell and Jim Bennett, sons of Mr. Russell M. Bennett of Minneapolis, we located a bunch of goats in a rocky glacial cirque or amphitheater above timberline and after a stalk each of the boys downed a goat, but the hour being late and camp far off, we did not wait to skin them out but hiked for camp, which lay about five miles off at about 7,200 ft. altitude above sea level. Next morning Mr. Bennett senior and I took saddle horses, intending to ride as far as possible in the direction of the dead goats and to then complete the journey on foot as the ground was pretty rough near the cirque with frequent rocky "jump offs" and steep, densly timbered slopes extending from the top of one line of cliffs to the base of the next above. About noon we succeeded in getting the horses to within about half a mile of our destination but separated therefrom by a rocky spur which formed the extremity of one of the ridges inclosing the cirque and round the base of which we intended to go on foot, following a goat path at the base of the terminal cliff. Before leaving the horses we built a fire on the stones of a tiny creek and put our lunches where they would do the most good; and that accomplished we shouldered our rifles and pack sacks and headed up through the timber towards the foot of the cliff.



A 10-shot group at 100 yds. with the .250; iron sights, prone with sling.

The grizzly's skull and the cartridge which finished him.

As we wound and twisted through the underbrush and windfalls we came across from time to time very fresh grizzly diggings, so fresh indeed that it was very evident that they had been made within the hour in some cases, so naturally we were keenly on the alert to catch a glimpse of the maker, but we got through the timber and up to and around the goat path without seeing anything more exciting than one or two big blue grouse, which exploded almost from under our feet like giant fire crackers going off.

The winter snows, pouring down in great avalanches, had swept on right through the basin and poured down the watercourse leading to the main valley, sweeping a clean swath through the big timber which filled the mouth of the basin, leaving a long cleared thoroughfare leading back into the cirque and along this clearing Mr. B. and I advanced with a dense wall of standing timber on our right and the steep, rocky, scrub-covered slope on our left leading up to rocky cliffs with belts of timber in between.

We had gotten well into the flat bottom of the basin when suddenly a big blackish-grey animal, which looked as tall as a horse, dashed out of the tall timber on the right and crossing the open strip in the twinkling of an

1200 feet above the Grizzly's stamping ground.

eye, disappeared into the thick scrub at the foot of the hill on the left about 150 yards away. "A grizzly!" we both exclaimed, running forward, unslinging our rifles as we ran and getting our thumbs on the safetys, ready to throw them over at the slightest sign of the chance to get a shot off.

We ran perhaps 50 yards forward and to the right of the edge of the tall timber, the better to command a view of the slope opposite, and taking a sitting position with our rifles at the ready we anxiously looked for a glimpuse of the bear up on the hillside. Almost immediately I saw him; far up the slope, just emerging from the tall scrub which clothed the lower part of the hill and rapidly approaching an open slope of grass, which in turn was just below a thick belt of timber, which once gained would hide the bear for good. I naturally desired that Mr. Bennett should take the shot and hurriedly called "There he is! Hurry or he'll be in the timber and be gone." But unfortunately Mr. Bennett was a few yards from me and, not thinking it possible that the bear could have gotten so high up the hillside in such a short time, he was looking too low down on the hill. I watched the bear rapidly nearing the timber and anxiously listened for the report of my companion's rifle but still it did not come and all the time the bear was getting closer and closer to safety.

So again I shouted, "Hurry! Hurry! or he'll be gone." to which Mr. Bennett responded, "I can't see him; go ahead and shoot."

By this time the bear was within two jumps of cover 200 yards away and as I got the gold bead of the foresight on him and pressed the trigger, his head and shoulders were actually out of sight so that I had to aim at his rear elevation. The 100 grain open-point, Lubaloy bullet struck him about four inches below the tail and, as he was quartering away from me, passed into the right thigh, missing the bone but severing the femoral artery and cutting in two most of the muscles of the thigh.

The slope he was climbing was so steep that the blow of the bullet cut his hind feet from under him and he came crashing down the slope head-over-heels into the tall scrub below; he was on his feet in a flash and started up the hill again on the run, but stopped in the middle of the open patch and turning broadside on, with his head in our direction, looked fixedly down on us.

Mr. Bennett was ready for him now and as he stood looking at us Mr. B. fired and the 180 gr. boat-tail, open-point bullet from his Springfield Sporter struck the bear in the center of the belly, just beside the navel and came out low down on the opposite side, tearing a huge hole but not quite high enough to damage him seriously in the way of an immediate "knock-out" blow.

The impact, however, was enough to upset his balance on the steep slope and again he rolled down into the scrub but was on his feet again in a second; now he was furious and this time instead of attempting to either climb the hill of run down hill or away from us, he evidently decided to fight it out at close quarters, and in a second or two I got a glimpse of him as he leaped over and through the pine scrub, headed straight as an arrow for the clearing in which we sat, crashing through the timber like a runaway freight car, which had jumped the switch on a down grade.

There was absolutely no chance to get an effective shot in until he should break out of the timber into the clearing, which was exactly 35 yards across.

"Look out now! He's after us!" I warned my companion as we sat with our rifles trained on the wall of scrub in front of us, where we knew that he must appear.

The few seconds that followed while we waited for him dragged like hours and I remember thinking of the many predictions made, that the type of gun I was using would surely be found wanting under precisely the situation that I found myself; namely, big, dangerous game charging at close quarters. I reflected how much more desirable an anti-tank rifle or a big double-barrelled English elephant-rifle would be at the moment, but also reflected that neither of them would be any good if I couldn't hit the bear, and if I *did* do my part and placed the bullet in the right place the 100 grain bullet could be depended upon to make anything less than an elephant or rhino a mighty sick beast, so I calmed down and quietly waited for Mr. Grizzly to show up.

With a grand leap, that landed him fully 10 feet in the clearing, he appeared mouth open, red tongue lolling and white teeth flashing and every thought faded before the imperative need to get the little gold bead steadied on his head and the trigger pulled at the psychological moment.

As he came down on his second or third bound I instinctively felt that the moment had arrived and pressed the trigger just as the foresight flickered above the point of his nose.

At the crack of the rifle he slumped down and slid and rolled in a heap and like an echo to my shot came the report of Mr. Bennett's rifle, but the bear was already falling to my shot and the bullet just grazed the top of his withers.

He fell just ten yards away, and at the speed he was traveling, had our shots missed, he would have been on top of us before we could have gotten another shot in likely, as he was covering at least 15 feet at a jump; as it was, we neither of us spoke but keenly watched the big black bulk breathing its last in great gasps, hardly able to believe that he was really down and out and indeed personally—and I think Mr. Bennett felt the same—I should have felt very little surprise if he had gotten up and killed one of us yet, so overpoweringly strong was the impression he had given of terrible ferocity and strength.

Finally he ceased to breathe and after throwing a rock or two at him to find if he was "playing 'possum," we cautiously circled 'round to where we could see his head, our fingers on the triggers and ready to pump lead into him at the slightest move on his part; however, he was really and truly dead, so we photographed him and skinned him out, finding his hide full of teeth punctures, both fresh and old, with several scars of claw wounds about his face and neck showing that

he was a natural scrapper with his own species and always ready for a fight over carcass of elk or goat.

The pelage was fine, very dark with silver tips to the long hairs, while his claws were ivory white and five inches long in the center claws, and nearly straight.

His stomach was full of masticated pine-nuts, with a little mixture of wild pea or vetch roots and, like all grizzlys in this region at this time of the year, he was spending most of his time searching out and robbing the "Caches" of the squirrels who at great trouble and expense, had gathered handfuls of the large sweet nuts from the cones of the "Lumber Pines," which grow just below timberline.

These nuts they carefully bury in many holes round the base of the trees and in rotten logs, and in winter and spring dig them up for food but, as all the grizzlys in the country were industriously digging up their tiny hoards and fraudulently converting the same into bear grease, starvation stared the unfortunte squirrels in the face.

A postmortem examination of the wounds showed that my last shot had struck just above the left eye and exploded in the big bunch of muscles above the hinge of the jaws, the radiating "explosive effect," due to high velocity, fracturing the skull although no part of the bullet had actually touched the bone of the skull. The terrific shock of the impact and blowing up of the little 100 gr. bullet was enough to render him instantly unconscious and keep him so until he bled to death from the Femoral artery severed by the first shot and was a wonderful example of the peculiar "shocking effect" of these light high velocity bullets, which is not found in the case of the heavy bullets traveling at low velocity and it is precisely this "high velocity shock," which the critics are ignorant of, and which makes the small-bore, ultra high velocity rifles so deadly in most cases.

This "shock" is independent of bullet composition and is purely a product of high velocity alone and the weight and shape of bullet is immaterial except in so far as it affects the resulting velocity attained, but it is obvious that the longer the range the lower the velocity falls so an all-round bullet must have some provision for tissue destruction at long range, which is provided for by the expanding point bullet of many various types, and while a full-metal jacketed bullet will work well and fill the bill perfectly at high velocity of impact yet it would fail completely at ranges so long that the velocity of impact was too low except heart, brain or spine were struck.

I have seen many grizzlys killed during 18 years of hunting and guiding in the Canadian Rockies and I can confidently state that I do not believe that a .45-70 bullet of any weight or type would have had anything like such a destructive effect, as either of the two wounds made by the .25 Niedner as previously described, and I believe that if I had been carrying a .45-70 that day that the first shot in the rump would never have stopped him getting away, and that the head shot as he charged would not have stopped him at all or only momentarily, and certainly would not have knocked him cold as the .25 speedster did.

At the same time I would not recommend any .25 cal. rifle as a grizzly gun for the "once a year hunter," as there is no margin or leeway for an off shot and the minimum load for big bears at close quarters to my mind is a .30 caliber 220 gr. soft-point bullet at 2200 ft. to 2400 ft., or better still, the .400 Whelen with its 300 gr. bullet at 2400 f. s., but for an all-round gun, effective on anything from squirrels to mountain sheep in the ordinary hunter's hands; and in the hands of an expert for any game that walks the American continent, this 250 Niedner-Springfield is very, very hard to beat.

My rifle has a 24-inch close chambered barrel beautifully turned, polished and blued, fitted into a specially smoothed-up Springfield action with a delightfully crisp 3½ lb. trigger pull, which suits me down to the ground; the foresight is a Lyman gold bead with flat face, visible in almost any light but not glaring in full sun and a No. 48 Lyman rear peep sight, which combination I know is fast enough to catch a charging grizzly and also strong enough to stand the gaff at hard mountain hunting. The stock is a work of art, no less; the maker being Mr. James V. Howe, late of Philadelphia. The wood is a very dark "black and gold" piece of walnut wonderfully fitted, polished and checked, and its perfect fit and balance must be seen to be believed. I feel that I owe Mr. Howe a debt of gratitude for the skill and care put into that stock, far more than I paid for I am sure and to that perfect fit and balance the success of that last shot at the grizzly is very largely ascribed.

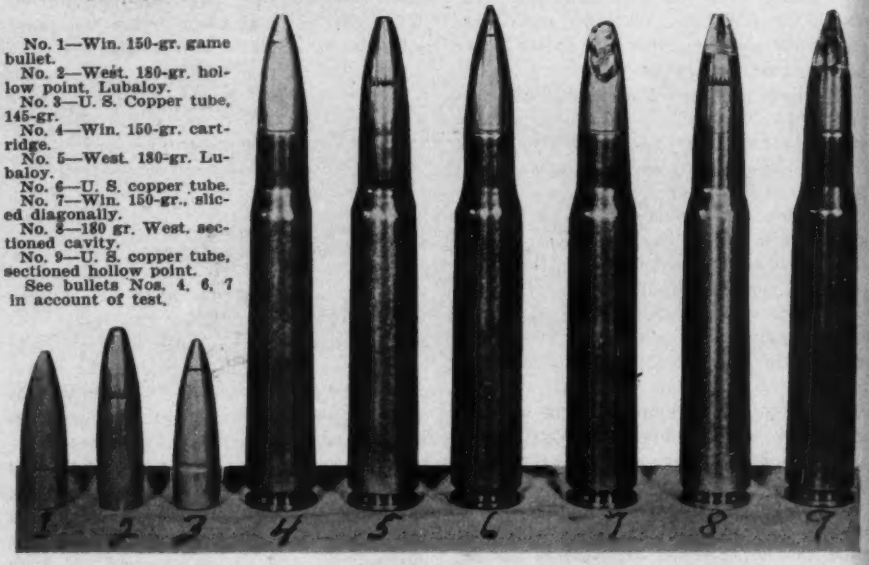
The shell used is that of the .30-06 Springfield, necked down to .25 caliber, and with the rifle comes a loading tool which is chambered the exact size of the rifle chamber. When fired the shells do not expand in either the body or the neck, consequently no powder gas escapes past the bullet as is usual in commercial chambers and also no resizing of the neck is required when reloading the shells, making the process very simple and rapid. The barrel has a 12-inch twist and will handle the 86 gr. bullet of the .25-20, the 87 gr. and 100 gr. open-point bullets of the Western Company, and also the 117 gr. bullets of the .25 Rem. Auto., which are jacketed with the thick Lubaloy metal, giving one a wide choice of loads for various purposes and velocities up to 3300 f. s. with the maximum of accuracy.

At the target range I find no difficulty in making 2-inch groups at 100 yards, firing 10 shots from prone position, using the sling and with iron sights, and when I took it to a Turkey Shoot last fall the shoot stopped right there and then I did not resume until it was agreed that I should shoot at 200 yards while the rest shot from 100 yards! And even at that I got my share of Turkey!

He fell just ten yards away and would have been on us before we could have gotten off another shot.

Bullet Points and Alibis

By Capt. E. C. Crossman



No. 1—Win. 150-gr. game bullet.
No. 2—West. 180-gr. hollow point, Lubaloy.
No. 3—U. S. Copper tube, 145-gr.
No. 4—Win. 150-gr. cartridge.
No. 5—West. 180-gr. Lubaloy.
No. 6—U. S. copper tube.
No. 7—Win. 150-gr., sliced diagonally.
No. 8—180 gr. West. sectioned cavity.
No. 9—U. S. copper tube, sectioned hollow point.
See bullets Nos. 4, 6, 7 in account of test.

THOSE of us who have used firearms in other than the pages of a sporting magazine, are fully aware of the fact that one can commit quite serious mayhem on the forward end of a bullet, and still not alter that bullet's virtuous intent to go just where the normal bullets of its family wind up when fired.

Not until quite recently, however, did I realize how far you can carry this disfigurement and still hit there or thereabouts.

It came to pass through the sectioning of the points of a number of modern game bullets to study construction and the presence, therefore, of a number of cartridges with bullets looking as if they had been in head-on collisions.

The heavy barrel was being used at the range to determine the points of impact of various game shooting 1906 cartridges, wherefore when that thing was finished, I decided that I'd see just how far off the paper and to what portion of the landscape these mutilated bullets would shoot.

To get a point of normal impact, a .30 cal. U. S. copper tube, 145 gr. at 2800 ft. secs. was fired at 200 yards, pressure barrel, telescope sight, muzzle and elbow rest. Following this, a Winchester 150 gr. spitzer game bullet at about the same velocity, was sent up, same point of aim. They struck four inches apart, and a point half way between was taken as a normal point from which to measure the departure of the battered boys.

As a further check a Western hollow point 180 gr. 2700 ft. was sent up, striking 3 inches lower than the copper tube, and close to the Winchester bullet.

Victim one, was a copper tube U. S. 145 gr., half of copper tube cut off clean to show the construction leaving the bullet intact when viewed from one side, the other with half the tube removed by cutting half way through it where tube joined the bullet.

Point of impact, 2 inches below normal.

Victim two was another copper tube, minus the entire tube, leaving only a hollow point bullet.

Point of impact, normal, printing practically on the uninjured copper tube bullet hole.

Victim three was a third copper tube, shown as No. 9 in the print. It was hack-sawed half way through, at right angles to its long axis at a point at the bottom of the cavity in the bow into which the tube is fitted, then another cut made down through the exact center of the point to meet the first saw cut. Point of impact, 11 inches low.

Next was a Western open point Lubaloy, cut diagonally, exposing all the hollow point. Point of impact, normal.

Another open point Lubaloy was sectioned straight down the length of the open point, leaving half the cavity exposed for inspection.

Point of impact, 10 inches low, 6 inches right.

The Holy Inquisition, when it got to the Winchester game bullets, had cut off diagonally the point of the first one, in much the same manner as the Western, but a larger cut.

Point of impact, 12 inches low.

This is shown as No. 7 in the print.

The next bullet had its entire game point broken off short in spite of its struggles.

Point of impact, normal.

The entire seven bullets, battered and cut in a manner requiring tools to accomplish, grouped in 14 inches at 200 yards.

Needless to say, no claims that repetition of the test would give the same results, are to be inferred. Only a complete test of not less than five of each sort of bullet, would show this. A second bullet, battered like any one of these might shoot off down toward Johnsons or some other such spot.

The facts remain as to this particular shooting, incidental to other tests, and fired merely from curiosity. It is pretty safe to infer from these results that any ordinary magazine, belt wear, or rough handling battering or twisting of bullet points can be ignored from the same shooting standpoint, because aside from the complete breaking off of the copper tube, which resulted in a normal impact, not one of these sadly mistreated bullet could be duplicated save with tools and fell intent.

Incidentally, with the same heavy pressure barrel which was the first one to waltz into Camp Perry competition in 1920, the following game cartridges were fired at 200 yards, muzzle and elbow rest, telescope sight, same point of aim, machine rest effect up to the limits of human falibility of aim and let off.

U. S. C. Co. copper tube, 145 gr. V. 2800 ft.
Winchester 150 gr. spitzer, V. 2700 or 2800.
Western 180 gr. hollow point, V. 2700 ft.
U. S. C. Co. 180 gr. Palma, V. 2600 ft.
Frankford 170 gr. tin can, V. 2625 ft.

Each lot fired five rounds, total of 25 shots.

The total group size for the 25 shots was 8 inches, at 200 yards.

When, however, the two extremes, 145 gr. copper tube, and Western 180 gr. open point, were tried in a light 31 inch barrel Mauser, the copper tube shot 9 inches lower than the Western bullet, showing what happens when you go to confusing barrel whip and vibration, with ballistic experiments pertaining to cartridges alone. Wherefore our affection for the Mann rest during our work at the Small Arms Ballistic Station, in charge of Major Wilhelm.

Those hopeful riflemen who attempt to deduce velocity differences in various cartridges by shooting them in light barrel rifles, and noting the points of impact, might get a gleam of the truth from noting just this one little experiment, repeated in various forms a hundred times at the Ballistic Station. There is only one safe check, a transit set up at precisely the rifle bore height, and laid on a muzzle screen to measure the angles of *departure*. Then if with the same departure angle, a bullet of one lot prints higher at a given range than a bullet of another lot, it is safe to say that either the cartridge has more velocity or the bullet a better ballistic shape, including possibly more weight.

For ordinary testing, a heavy barrel is safe to trust alone, without the transit, but never in a light barrel or service weight.

The groups made with this mixed lot of match and game ammunition ran from 2½ to 5 inches in the heavy barrel, so it would appear that one need not worry with any of the modern Springfield game cartridges.

Is Hand Gun Fit Important?

By F. C. Ness

TO me this problem of choosing a suitable side-arm is homologous to selecting a particular pair of shoes, and I think too many hand gun buyers fail to realize this. No matter how well we like the make, type, style and size of a particular pair of footwear, we should not entirely ignore the suitability of their shape for our peculiar feet, nor fail to also consider how they *feel* upon our own particular pedal extremities. No matter how perfectly satisfactory they are in other respects, should they fit us so badly as to cause discomfort, they should be promptly rejected.

Personally I have tried in vain to accustom my hand to the grip and hang of certain excellent hand guns and, finally, had to reject them. Dr. J. H. Snook, the nationally known pistol shot, told me (via letter) that no one can shoot a revolver very good until he adapts his hand to the grip. For illustration he said that both he and A. P. Lane, another well known shooter, can shoot the same gun fairly well, though the latter's hand is short and stubby, while his own is long and slender. In adapting their respective holds to the same grip, Lane grabs high and close up, while Snook holds loosely, low down on the handle. But, it has been my experience that there are certain hand gun grips to which I can never even hope to adapt my hand.

Of course there are several hand guns with different grips that I can shoot fairly well, but such shooting is always accompanied by a sense of something lacking, that makes it impossible to attain the quintessence of pleasure. With the little Colt Police Positive Target for instance, I have to hold my thumb higher than the trigger-finger, which points down. Thus, the side pressure of the thumb tends to tip this comparatively light revolver to the right, while the unconscious impulse, to counteract this right-tipping by a reverse pressure on the part of the index finger, sometimes goes too far and tips the gun to the left, thus causing a lot of horizontal deviation. The low position of the trigger in relation to my hold tends to depress the muzzle of the gun at varying degrees, thereby making the vertical deviation also great. And, as these two deviations are never constant, it is impossible to set the sights to cure the fault and bring the groups to centre. So I find it impossible to adapt my hold to the grip on this gun.

On the Colt .45 Automatic my hold is quite the opposite, for the trigger finger comes above instead of below the thumb. And, because I can get a straight-back pull from this hold, my shots generally have practically no vertical deviation, and, as this gun is heavy, and because (thanks to the automatic type of grip) the pinch between thumb and index finger comes near the centre of gravity, there is practically no tipping, and thus but little side deviation. The result is, since I have become accustomed to the .45 Colt Auto, I can shoot it much more accurately than the .22 W. R. F. Colt Police Positive Target, despite the fact that I could afford to practice much more with the cheaper .22 ammunition.

So, too, with the .45 S. A. Army. In spite of its ball-like feel in my stubby hand, and in spite of the downward slope of the index finger on this grip, which causes me to pull the trigger with the edge instead of the flat of the first-joint, I can get fair scores on the Standard American Target at conventional ranges, and can pick tin cans out of the air with fair consistency; solely because the S. A. balances well and my thumb is held exactly opposite and parallel to the trigger finger, thus giving me good control. I must admit that hand-loading has enabled me to do a great deal of practicing with the Single Action .45, but even at the outset, I could do fairly well, putting five consecutive shots into a playing card at ten yards, and two cylinderfuls of black and smokeless factory loads into the four-inch rifle "Bull," at the same range, the first day I tried the Peacemaker. These targets were published in Hunter, Trader and Trapper in 1922.

To right-author gripping Colts Police Positive .22. Looks small but feels good. Only curve back of trigger guard is too high and narrow Gun balances well, but gives me poor results.

Figure 1

Figure 2

To right—Holding the S. A. Colts 45 and the .22 auto. Note first joint of trigger finger only is within the guard of the .22 pistol.

To left-author holding and aiming 45 auto. Compare with Fig. 1. Note how differently the two grips fit the same hand.

Figure 3

To left—Compare with Fig. 3. Note on revolver same index finger can reach trigger with second joint hidden.

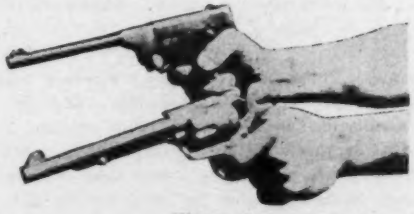


Figure 4

But "hand gun fit" infers more than the mere size and shape of the grip. It should include the *feel* of the gun in the hand, which means hang or balance. This is gotten by length of barrel, the slope of the handle, and position on the gun of the grip, as those on automatic pistols for instance. Thus, on the same gun I found that I could do better on the target with a 7½-inch barrel on my .45 S. A. than with the 5½-inch. The latter was quicker for field shooting, and in strings of rapid fire I could get back upon the target much quicker with it, but for paper scores, deliberately fired, the 7½-inch barrel gave the best results, and it seemed to balance steadier in my hand. And, while I could snap a .22 bullet into a sparrow with the six-inch Stevens No. 35, I could do far better on the target with the ten-inch Lord's Model, thanks to its finger-spur. And the best hand gun I have ever used on small aerial targets was a nondescript Harrington & Richardson six-inch seven-shooter, because it balanced right for this particular kind of shooting. For shooting flying targets, the .22 Colt Automatic is a disappointment as far as my own use is concerned; it seems to be too muzzle-light, making sighting uncertain. So it has been my experience that a long-barreled, muzzle-heavy gun is the best for deliberate work, while a perfectly balanced gun, feeling like a lump

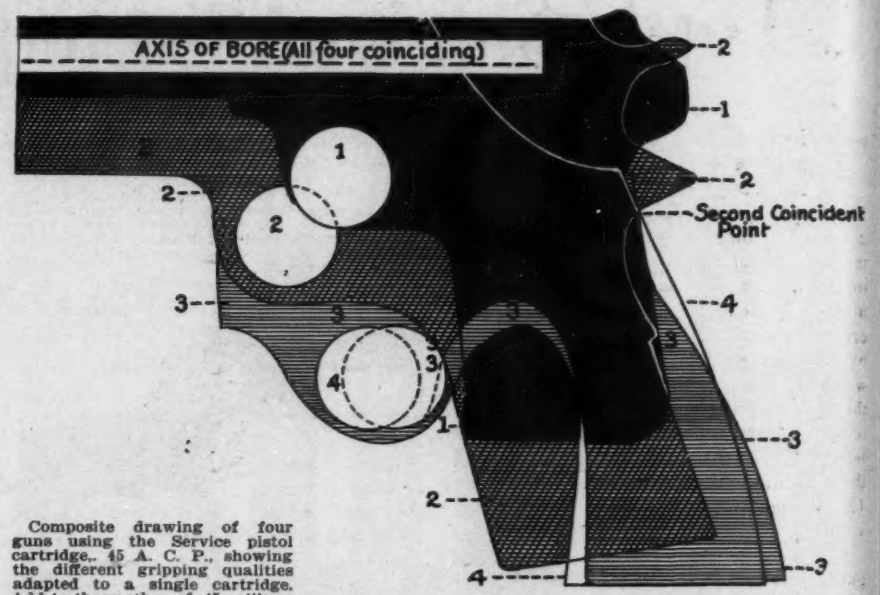
in the hand, such as the 5½-inch Single Action Colts, the six-inch Stevens, and the six-inch H&R .22, are best for quick shooting. The .380 Remington pistol, and the .45 Colt pistol feel the same but the trigger-pulls are too long for the best results on flying targets, I have found. There is but one gun out of the great variety on the market that fits me perfectly for all around work, including hang, feel, and shape of grip—the .38 Special, Colts Officers Model, with 7½-inch barrel. And closest to it comes the .44 Special, Smith & Wesson Military Model, 6½-inch barrel, yet I do not consider the "saw handle" grips ideal, from the standpoint of comfort, in this calibre, when one likes to manufacture his own loads; stiffer than those available.

Of those who may scoff at the importance of "hand gun fit," and who contend that after one gun is learned the others can be quickly mastered, I would ask: "When the build of a gun or its grip are so outrageously unsuited to a certain shooter that they cause him downright discomfort, do you still advise him to continue experimenting with such a weapon, or would it be an act of sanity to search the markets for some other hand gun better suited to his particular hand?" Certainly it would seem that even the first gun could be more quickly mastered, if it fit the shooter to perfection; in fact, that the time of learning would be in direct proportion to the degree of misfit.

Any one who has shot it will concede the general excellence of the little .22 Colt Automatic. I have owned two of them. I say "have" purposely, because finally I had to admit defeat and reluctantly reject this gun for my use, because it fit my short-fingered hand so badly I was unable to shoot it with comfort. In order to reach the trigger comfortably I could not keep my thumb against the stock, thus giving me an insecure hold, and making my shooting uncertain. The trigger-reach was so great for me that it affected my shooting, getting only 75 per cent results from 75 per cent fit.

Also in pocket guns, the .380 Savage Hammer Model, automatic pistol had long been my ideal in theory. But, when it came to using it, I found that to hold that wide grip, for the space of a single shot, actually hurt my hand, with straining and stretching. Even the Savage Arms Corporation seemed to realize this at last, for I understand that they now issue this pistol with a modified grip. As it was, I had to give up a many-years' idea on account of bad fitting, and finally selected the .380 Remington pistol, which has made good, leaving nothing to be desired in grip or accuracy. This was another incident that convinced me of the general importance of selecting different grips to suit different hands for the best results.

I have had the opportunity of coaching a number of my friends in hand gun shooting and have noted the effect of different grips in their hands. One fact has stood out prominently. Those shooters who previously had some experience with .22 pistols could consistently miss even the target-butt with my .45 revolver, rarely hitting the paper at all. But with the .45 pistol, they could keep the majority of their shots on the paper, getting many of them close to the black. And those who were learning the rudiments of the game with my .22 pistols, could do far better with the automatic-type of grip on the No. 10 Stevens, than they could with the revolver-type of grip on my Lord Model pistol (Stevens).



Composite drawing of four guns using the Service pistol cartridge, .45 A. C. P., showing the different gripping qualities adapted to a single cartridge. Add to these other of .45 calibres such as the S. A. Colts and the S&W Schofield and you'll get more variations. Or include other calibres of relative power that are preferred by some and more differences will result.

A glance at the line of .22 calibre hand guns on the market, including pistols, revolvers, and single shot, will convince anyone of the many slight and extreme gripping modifications available to the buyer who wants a "twenty-two."

No. 1.—Savage 1911, listed in Burdhard's (No. 124) catalogue, from a number made up for the Government Tests of 1911.
No. 2.—Colt Service Pistol (Automatic).
No. 3.—Smith & Wesson 1917.
No. 4.—Colts 1917.
Circles indicate trigger-finger hole between guard and cocked triggers.

It seems that these straight grips are sloped just so for the most comfortable hold, and are so placed to give the gun a balance that gives the pupil an assurance of ability. One thing I positively know, it forces them to grasp the grip at the same height for each shot, on account of the spur or shoulder on the rear of this type of grip. Also the weight of the gun rests upon their middle-finger, because of the straight-rearward extension of the trigger-guard. This leaves the trigger-finger free for a better pull. And, because it is the only single shot equipped with this style of grip, I always recommend the No. 10 Stevens as the ideal instrument of learning for any would-be pistol shot.

While it may be true that those individuals who are fortunately endowed with long fingers, can do fairly well with any one of a variety of slightly different grips, after adapting their hold to it, it is also true that they can do better with a perfectly comfortable and natural grip. And for those with short fingers or abnormal hands it is even more important to choose the right gun for the best results. This ideal fit can be gotten in more than one way.

One way is to make a grip to suit yourself. The correct hang and balance can be gotten by cutting off a long barrel or by loading the butt with babbit or lead. But the best way, if possible to do so, is to visit a large gun store personally and buy from a large assortment through handling and elimination.

After deciding upon the purpose—pocket gun for personal defense, .22 pistol for learning, medium power for field use, or heavy caliber for dangerous game—pick up, handle, and judge the feel of each of the many weapons in the particular class you have chosen. Then aim and snap the gun; the one that lets the hammer fall with least disturbance of aim is perhaps the best for your own use.

This selection for the best fit I consider as important as choosing the proper calibre, because it is patent that in a gun that fits so good it can be controlled perfectly a medium powered cartridge is more useful than a heavy calibre in a gun whose misfit can cause only repeated misses. Fortunately, however, there are a number of different grips from which to choose in each calibre. Some will contend that in a pocket gun for short range this is not so important because of the ease of hitting. But, a perfectly fitting pocket gun is the only thing to consider for self defense, which often calls for instinctive shooting, without a chance to use the sights at all. Regardless of what purpose for which it is chosen, the hand gun is primarily a handy, emergency weapon, and one that suits the user so nicely it can be handled as naturally as he points his finger is a friend in need, indeed.

Loads for the Thirty-Two Twenty

By W. S. Davenport

THE cylinders of all 32-20 revolvers have thick walls because they were all designed for larger cartridges. These strong walls, the large powder capacity and the small caliber light bullet permit the safe use of a heavy charge of dense pistol powder that will develop a muzzle energy in excess of that of the .45 Colt. This energy can be converted into shock and killing power by using hollow point bullets, concerning which Horace Kephart has recently expressed the opinion that they are permissible for use in self defense against outlaws. A pistol bullet, he states, should have a hollow point if the caliber is small and a flat nose if large. The 38 Special he considers to be lacking in killing power.

The speed of the 32-20 with the 100-grain bullet and the maximum safe load of pistol powder is estimated to be 1250 f. s., with a corresponding energy of 347 foot-pounds. The recoil is less for the same energy than with the larger caliber cartridges with heavier bullets and the frame is the neat one designed for the 38 Special. The 32-20 has some valuable qualities,—a high speed, a choice of penetration or good shock and killing power and a muzzle energy up in the class of the big cartridges, but these qualities have been hidden because the change from black powder, was to slow burning smokeless rifle powders. The load of Bulls-eye for years has been three grains, which gives the standard speed of the factory cartridges. Now it is 4.3 grains for all good revolvers, with the 115-grain bullet. I have fired 4.4 grains with the 100-grain bullet in the S&W, also 5.9 of No. 5 and 9 grains of No. 80. A charge of 4.0 grains of Bulls-eye gave 40 per cent more penetration than two standard speed loads, one 5.0 grains of No. 5, the other 7.5 of No. 80. The tests were made with full patch bullets to avoid the errors of mushrooming. This penetration corresponds with a speed just under 1200 f. s. for the 100-grain bullet and an energy about equal to that of the 44 Special. It is a good charge, safe and powerful enough, and it may be used with lead bullets.

The 32-20 S&W now has a heat-treated cylinder to hold the pressures of the high velocity factory cartridges. There is a gap of about ten thousandths of an inch between the cylinder and barrel to cushion the blow as the bullet jumps across and thus hinder stripping the jacket of the soft point bullets. The bore appears to be a little loose; it is said to be .313 rifling and .308 smooth bore, while the 32 short and long are .313 rifling and .304 smooth bore. This although the 32-20 is supposed to be a .311 caliber and the others .313. The holes in front of the chambers pass a .315 bullet and this size can be loaded into shells that do not stick in the chambers.

These precautions do not mean that the company advises us to use the high velocity soft point cartridges, but that they have done what they can to protect us if we do use them. Such a general looseness of fit naturally affects the accuracy. There are too many varieties of loads and the gun cannot be bored to fit the cartridges as exactly as the 38 Special does.

At least this last is a reasonable assumption, but after consulting several authorities about the accuracy of the 32-20 in revolvers I am all at sea. One states that at 20 yards, 10 shots, machine rest, the 38 Special groups in one-half inch mean radius, the 32-20 lead-smokeless in 1.56″ and the lead-black powder in 2.68″. Another got groups of 10 shots at 50 yards machine rest in 2⅝ inches measured from centers of shots farthest apart. That was with soft points and Unique powder. Two state that hand loaded 32-20's are quite accurate, another that the factory cartridges can be turned out to group in 1.33 inches mean radius at 50 yards. One states that the 38 Special will group in 3 inches and the 32-20 in 5 inches at 50 yards, presumably off-hand. One states that in former times groups at 50 yards measuring 18 inches mean radius were considered to be satisfactory, although long since much improved. I am informed that the long bullets are not more accurate than the short, that both the 38 Sp. and the 32-20 can be factory loaded to give 2-inch groups, mean radius, at 50 yards and that some companies are giving even better results than that. Also that bulk smokeless are more accurate than Sharpshooter, that bullets vary so in diameter that the barrel can not be bored to a close fit and still be safe; that it would be better not to use metal cased bullets and have the grooves deeper as they used to be. In contrast to the 2.68 inches mean radius groups with black powder mentioned above, another good authority has got 0.25-inch groups at the same 20 yards with hand loaded 32-20 using black powder.

In view of this confusion I can not state anything about the accuracy of the 32.20 revolver, as I can not shoot off-hand well enough to test the matter and have no machine rest. It appears to be feasible for ammunition makers and revolver manufacturers to co-operate and produce a few cartridges loaded with pistol powder for which the revolver manufacturers bore their guns to shoot accurately. It is evident that these cartridges can have more power than the standard factory loads now in use. It is not likely that hollow point bullets will come into use for self-defense, and if not then the 32-20 will remain inferior to the 38 Sp. for that purpose, but as an outing revolver it would take a higher rank if accuracy were obtained and hollow point bullets were used for running game and vermin. The longer hollow points are no longer sold but with the shorter weighing 90 grains and a charge up to four grains of Bulls-eye an excellent load is obtained, with a high speed, good shock moderate recoil and high muzzle energy. The hollow point is more certain to mushroom at the low speed of revolver cartridges than the soft point. It is a better load than the high velocity soft point factory cartridge.

The Ideal round ball 31358 is about right for the 32-20 S&W. A charge of four grains of E. C. wadded gave me the best results. The wads were cut from larger ones with an 11-32 punch sold at hardware stores. The mouth of the shell must be opened to prevent slicing the ball. Any little accidental looseness will give a squib load; the impact of the ball will be heard after the explosion and there will be a shallow dent made in a pine board. The ball is light and has a small bearing surface against the shell. It worked well in muzzle loaders and well enough in breech loading pistols with cylindrical shells, using black powder, the ball seated down on it; but in bottle-neck shells with light charges of smokeless powder the ball is uncertain, especially in the smaller calibers. The logical powder should be semi-smokeless, which I have not tried.

The ball is easy to grease and home-made grooved bullets that are to be crimped are hard to grease; it is a messy job or else it requires an expensive machine. Must bullets always be crimped? If not then we can give them the round nose of the ball, seat them nearly flush with a little melted Japan wax on top and they will be as easy to use as balls. With no grooves there will be more surface to grip the shell, no grease between to lessen this friction and the diameter may be larger than a metal cased bullet.

To test this, I ordered a couple of cherries and cavities from the Yankee Specialty Company. They sent me an ingenious single-cavity mould, the cavity bored through the whole mould from top to bottom and plugged with three detachable plungers, which cast three slugs all with the same spherical nose but with different lengths and shapes at the base. One slug is quite short with a hollow base, the second is also short with a flat base and the third, after some tinkering, casts a long slug with a flat base. The diameter is .3145 to .3150. The three weigh 55, 68 and 95 grains. The hollow base slug I have not tested. The others do not bulge the shell unless they are forced by a ring which need not be done. The primed shells supplied by the Winchester company have long necks without rings and they take the longest slug

nicely when seated deep enough to form a space for the top greasing.

The tests with these two slugs were extended over some time, on the principle that only a few shots a day keep the police away. They were quite interesting and instructive, as almost every shot had some significance and suggested further tests. The lighter slug proved to have too little confining power with light charges of powder, its penetration was greater when it was crimped at the nose. The heavier slug was better in this respect, a charge of two grains of Bulls-eye gave the same penetration crimped and not crimped. But although these light loads never gave a squib load and had all the penetration one could expect, nevertheless all of them left unburned grains of powder in the barrel, using Bulls-eye, No. 80 and E. C. They needed a stronger ignition, either a stronger flashing primer, a priming of black powder or the use of semi-smokeless. This fault can be removed by using heavier charges, but with them the heavier slug gives a better balance between bullet and powder, so I dropped the lighter slug. With heavier charges the long slug behaved unexpectedly. The equivalent charges when standard bullets are used are 3.0 grains of Bulls-eye and 7.5 of No. 80. With this slug the Bulls-eye behaved properly, but the No. 80 was an excessive charge with too high pressure. The slug is lighter than the standard conical bullet, hence this high pressure comes from the larger diameter, and yet the fired slug shows little flowing back of metal at the base. A single grain of Bulls-eye will stick it into a board and that one grain leaves a metal-cased bullet sticking in the barrel. This may come from the considerable friction of the over-size rather hard alloy ,1:20, on the neck of the shell requiring it to be cushioned by the air-space left when dense powder is used. The slug should perhaps be not over .314 in diameter and 1:40 alloy, for a guess, if the shell is to be filled with powder and lead. It is half an inch long and leaves lands marks a full ⅜ of an inch. If there is no leading in a very foul barrel, a point I have not tested, I think that this grooveless uncrimped slug is a useful load for the .32 .20 if home-made bullets are used, because it is easy to grease.

The plunger mould served my purpose well, but it is not easy to get perfect bullets with it as with the common mould. The top edge of the plunger cools off rapidly and chills the lead at the edge of the base unless one casts fast and shuts the mould as quickly as possible after ejecting the bullet.

DEN TALKS

By

Ernest Coler

LOCOED LEGISLATION.

TELL the truth now, and shame the devil—what have you boys done lately toward warding off and delaying the evil day when well-meaning fools and white-livered reformers will prevail upon a bunch of benighted lawmakers to make shooting a high crime and the mere possession of firearms a jailable offense?

Yes, yes, there is the Constitution of the United States, providing that "the right of the people to keep and bear arms shall not be infringed." What of it? Do you notice the unctuous ardor with which the eighteenth amendment is enforced? And did you ever see anybody throwing fits about enforcing the fourteenth and fifteenth amendments to that same old Constitution, if you happen to know what they are about? Oh, yes; that's different.

So it is a safe bet that you haven't done anything, just like the rest of us who hope to goodness that somebody else will do something about pounding the fear of the peepul into the long-haired gentlemen who year after year, month after month, and day after day feed grist to the legislative mill without really knowing what the people who pay their keep want to have done.

Newspapers should be one of the greatest forces in fostering a reasonable attitude toward firearms that are in the hands of the law-abiding citizen. But newspapers don't know everything. The other day, for instance, the Chicago *Tribune*, by its own daily reprinted admission The World's Greatest Newspaper, went into editorial hysterics about the almost criminally careless manner in which an epoch-making American invention of great military importance had been bandied about, divulged to everybody, including our potential enemies. In a fiery outburst, written by somebody who probably didn't know the hind end of a rifle from a soup stick, the paper took the War Department to task for permitting so important an invention to become a matter of common knowledge, thus depriving our own country of an advantage we should have enjoyed alone.

Boys, what do you think that great invention was? Don't laugh now! Why, it was the boat-tail bullet, something which the Swiss, the French and others have been using the last fifteen years, more or less. As I said, even newspapers don't know everything, but this shows how much thought is brought upon such matters by the moulders of public opinion.

Tobacco will probably be next on the reform program; the anti-tea and coffee crusade is beginning to lift its infantile head and there are localities in which it is against the law to kiss your own wife in a public place. In Illinois you go to jail for boxing, for looking upon boxing and for everything else that has to do with boxing. The House of Representatives of the South Carolina Legislature has passed a bill prohibiting the playing of billiards or pool at any time, anywhere within the state. A game in a citizen's home is illegal. Utah has prohibited smoking in public and offenders are arrested. In Utah—think of it?

All this goes to show that if we are satisfied to sit down in the hope that somebody else will do something, our goose is cooked. When somebody shoots off his Waterman in your daily paper about forbidding the manufacture of firearms and about laws that disarm the householder and citizen, if you don't agree with him, don't let this stuff filter through the public mind without opposition. Sit down and write your views on the question and get the paper to print it. Newspapers usually are willing to present both sides and while the Chicago *Tribune* editors may not know a boat-tail bullet from a hoof nail they never hesitate about printing opinions that run counter to their own.

Every live club should appoint one of its members possessing the required skill, to act in the capacity of publicity man for the club. Whenever unfavorable comment appears in the press it should be answered promptly; it should be made clear that what is presented is not the opinion of an individual, but the organized opinion of a number of men. Organized opinion is what counts; it is the one thing that boots kings off thrones, hoists politicians out of their saddles, lawmakers out of their berths and keeps the door of the White House closed against gentlemen of the tribe of William Jennings Bryan.

If we expect that something be done, we all must do a share of it. The anti-firearms mania is a willing horse and there are too many people who want to ride it.

THE BALLISTIC PRIMER

by

J. C. GRAY

PART IV—CHAMBERS AND RIFLING

(Continued)

THE usual practice, regarding the matter of selecting a suitable pitch of rifling or length of twist, up to the present has been to make as good a guess as experience with similar cases permitted, and then to make up several barrels having twists increasing from somewhat below the "guess" to a little above it. These barrels were then fired for accuracy, and the pitch giving the best results was selected.

This method doesn't look very intricate, and as a matter of fact, gives good results in most cases. Practically, by reason that very little concerning the laws which govern the selection of twist has been definitely determined, it has been the only method available until very recently. However, as is almost always the case where something is unknown, experiments have been made for years looking to an answer, and late developments indicate that the length of the bullet is one of the factors of great importance. In fact, if the rifling pitch for a new arm and ammunition be selected proportionately to a pitch known to give good results, taking the length of the bullet in calibres as the basic factor, the new arm will almost surely be properly rifled.

In general, no attempt has been made in these papers to tell about the bullets flight, but the rifling has such an important influence on flight that it may be worth while to consider what happens to the bullet for a short distance after it leaves the gun.

First, it may be stated with almost positive assurance that *all bullets "wobble."* For example, the U. S. calibre 30 armor piercing bullet gives no indication of tipping when fired through a screen, yet it does tip or wobble enough to whip itself to pieces on armor plate at short range, say fifty feet, which it will easily penetrate after the initial yaw, to give the proper name, has died out at from one hundred sixty to two hundred feet.

In the paragraph above the "yaw" is used and to define this term in simple language it may be said that the yaw of a projectile is the angle between its long axis and the direction in which it moves. Initial yaw is due to two causes, first, the looseness of fit of the bullet in the gun due to which the long axis will depart from the axis of the bore and the second, the unbalance of the bullet when the centre of gravity and the centre of form do not coincide. Bullets which are not uniformly and properly made will have this latter characteristic, which is called "dynamic unbalance," in large degree and will almost surely be inaccurate, due to a tendency to fly off at a tangent to the direction of fire just as an apple may be thrown when whirled at the end of a string. Dynamic unbalance cannot be controlled by proper rifling but only by care in the manufacture of bullets. Initial yaw due to the first cause may be controlled by proper design of rifling and form of bullet. The methods used in investigating this form of yaw are much too long and complicated to more than mention as being available. Large initial yaw will tend to reduce the range obtainable with a bullet of good form so it will be seen that a proper twist not only affects accuracy but range as well.

Regarding the matter of defining "pitch" it is believed that much confusion would be avoided if the use of the definition of pitch in inches for a complete turn could be entirely abolished and the pitch measured in "calibers." For example, the .22 Savage Hi-power has a 12-inch twist, so also does the 35 Winchester. It would appear that these two arms, then, have the same pitch. This is in realtiy not the case, for the pitch of the .22 is about one turn in 53 calibers, while the 35 has a twist of one turn in about 33 calibers, or a little more than half as much. Proportionately, then, the .22 bullet has a spin only a trifle more than half as great as the .35 caliber.

It may be that the interested rifleman will care to work out some data on spin for himself, and the following will give a method which may be used.

Let N be the spin in radians per second.

A radian is the angle whose arc equals the radius=57.296 degrees (approx.).

V=muzzle velocity in foot-seconds.

R=radius of bullet=½ caliber (in feet) because V is in feet per second.

n=distance of travel in calibers per turn of rifling.

Then: $N = \frac{\Pi V}{rn}$

For the two bullets under consideration, this formula will work out as follows:

.22 Hi-power

V=2800 f. s. (Western Ctdge Co.)

$r = \frac{.114}{12} = .0095$

n=52.6

Π=3.1416

$N = \frac{3.1416 \times 2800}{.0095 \times 52.6} = 17603$ radians per second.

35 Winchester

V=2193 fs (Winchester Rep. Arms Co.)

$r = \frac{.179}{12} = .014915$

n=33.5

Π=3.1416

$N = \frac{3.1416 \times 2198}{.014915 \times 33.5} = 13787$ radians per second

For both bullets this works out to a pitch equivalent to one radian in 62.8 feet at the beginning of the trajectory. It is quite possible that in designing the rifles in which these two bullets are used, the matter of stability was regarded as a function of velocity. However, this is not believed to be the case, for if one refers to page 215 of Sir G. Greenhill's "Notes on Dynamics" it will be seen that the stability of a projectile has little or nothing to do with velocity, but is, other things as to form being equal, a function of the length of the bullet in calibers.

An extract from the work referred to above shows as follows in part:

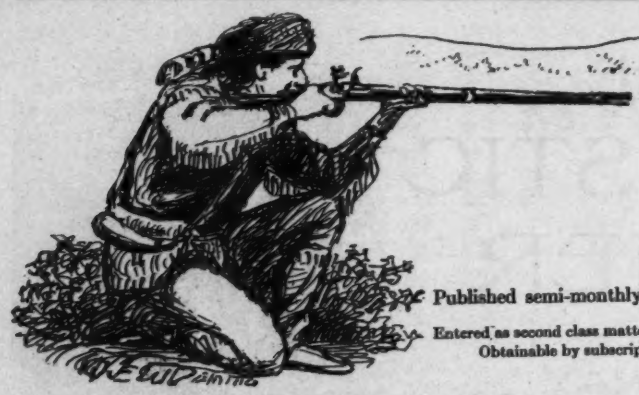
For a solid bullet (of given form).

Specific Gravity 8.0.

Length of Projectile in Calibers	Pitch In Calibers n	Angle of Rifling Δ
2.5	54.17	3° 19′
3.0	43.47	4° 09′
3.5	36.33	4° 58′
3.9	32.11	5° 56′
4.0	31.21	5° 45′
4.5	27.36	6° 32′
5.0	24.36	7° 21′

An interesting comment on this tabulation may be made in connection with the Caliber .30, 1921 National Match bullet which was, as will be remembered, remarkably accurate. This bullet was about 3.9 calibers in length, and it will be seen that the pitch of rifling given in the table for this length of bullet is n=, 32.11, which is very close to the pitch of

(Continued on page 19)



The American Rifleman

EDITORS
BRIG. GEN. FRED H. PHILLIPS, Jr.
KENDRICK SCOFIELD
T. G. SAMWORTH
ART EDITOR: CHARLES DUNN

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Another View of Preparedness

ONE of the fundamentals of American citizenship is the inalienable right to be secure in life, liberty and the pursuit of happiness. Another fundamental is the right to keep and bear arms. Both became part of the fabric of our nation while the United States of America came into being. The twain go hand in hand; the one is the means of assuring the other. Make it impossible for the American citizen to keep and bear arms, and his life, his liberty and happiness are placed at the mercy of the lawless.

The virtues of a sane preparedness program were demonstrated beyond contravention by the world war. The Swiss, a tiny nation, but 100 per cent skilled in the use of arms, emerged unscathed although the tide of devastation lapped about her borders. There may have been other reasons why the Hun was content to allow the Swiss to remain not only non-combatant but undisturbed; yet it is safe to assume that the skill of the Swiss as marksmen played no small part in the Hun's punctillious respect for the Swiss boundaries.

Nations are but great groups of individuals. Therefore circumstances such as those which deterred the Hun, unrestrained by any but selfish considerations, in his dealings with the Swiss, may be expected also to restrain those individuals, no matter of what nationality, to whom law has become a dead letter and has ceased to be a deterrent. In other words, just as Germany respected the rights and possessions of the Swiss, because they were a nation of marksmen, so the burglar and the thug will respect the rights and possessions of the citizen who is known to be a good shot, able and willing to protect himself. In fact, the citizen who is known to be skillful in shooting and known to possess firearms is usually left severely out of the calculations of the lawless when they plan their outrages. Possession by reputable citizens of firearms, coupled with a knowledge of their use, is not only the very best form of burglary insurance but is also a most potent wet blanket to all forms of lawlessness.

The real American, as a matter of good citizenship, should not only own and know how properly to use weapons, but must fight to the end against the proposed laws which seek to abolish a form of preparedness which is quite as important to our municipal life as are our policies having to do with national defence.

Prepared to assert and conserve our national rights against infringement by other nations, and equally well prepared to defend our lives and our homes against individual invasion by the thief and the thug, the United States of America, for Americans, will prosper.

Incidentally much stress has been laid by the reformer seeking to legislate firearms out of existence, on the inability of the criminal to obtain firearms if their manufacture were prohibited. Heretofore, The American Rifleman has pointed out that the weapon of the thug, the thief and the murderer is in most instances a weapon of foreign manufacture, especially since the war. In Chicago a few weeks ago, a Black Hand murder added its evidence to the correctness of this assumption. The killers, when apprehended, were found to be armed with revolvers of the Spanish imitation type, with which the country has recently been flooded and which, in the event of the passage of an anti-firearm law, could easily be made the object of smuggling operations more difficult to control and quite as profitable as the running of illicit rum.

Bankers Are Good People to Know!

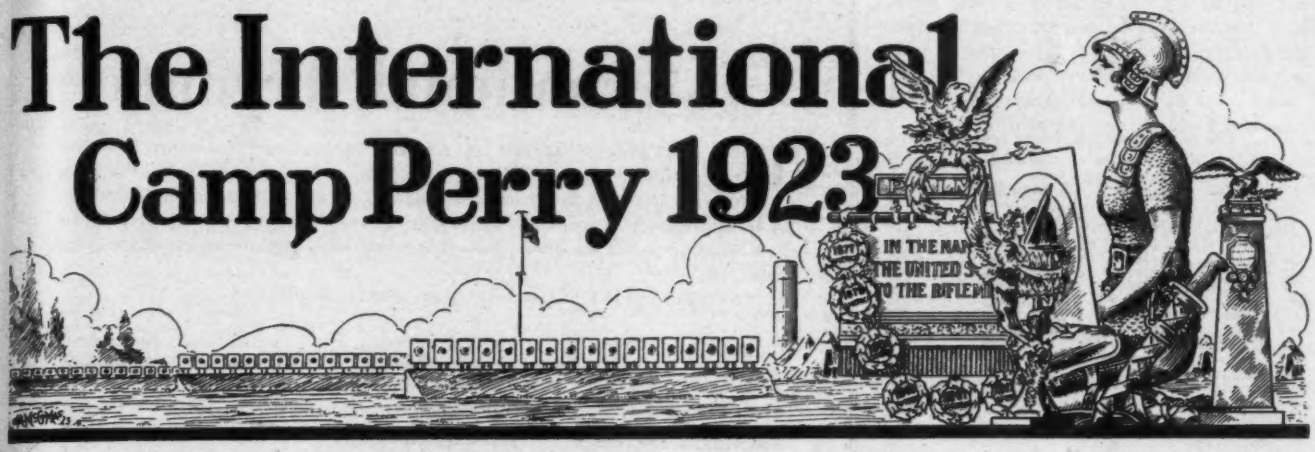
LAST year two or three small borers in Pique, Ohio, gave a good account of themselves as individuals in the small bore matches. This year they have a live club under way.

The following paragraph from a Piqua paper of recent date would indicate that the Piqua Club not only has shooters—it has ideas—ideas for community service that are bound to bear fruit in a strong, healthy organization.

> "Arrangements will be made for the members of the Piqua banking and loan companies to try out the rifles on the outdoor range next Thursday afternoon."

The epidemic of many robberies a few months ago caused considerable discussion as to present-day police methods compared with present-day criminal methods. The attitude of some bankers was no doubt aptly illustrated by a conversation reported to us in which the banker, when approached on the matter of teaching his messengers and cashiers how to shoot, said: "Why should I? I do not lose anything. I am insured." But there are bankers who realize that with more robberies insurance rates go up; that with robberies the community's confidence in the bank weakens, and who feel that when the inevitable fusilade starts they would prefer a dead brigand on the floor to a dead employee. Rifle clubs might do well to follow the example set by the Piqua organization. Such community service is bound to result in community support, and there is the further compelling fact that friendship of the bankers will mean much to an aggressive club interested in acquiring its own range and club house, nor should it be forgotten that the newspaper editor generally has a wholesome regard for the bankers' hobbies. Taken all in all, it will not do your club any harm to try the community service idea—starting with the banks.

The International Camp Perry 1923



TROPHIES FOR SMALL BORE MATCHES

The Hercules Trophy

WINNERS of The Two-Man Team Match in this year's small-bore program at Camp Perry will receive, in addition to medals, a splendid bronze figure of Hercules, the appropriate trophy presented for perpetual competition by the Hercules Powder Company.

The figure, which is from Tiffany's of New York, is 31 inches high, of a dark-green, phosphor bronze, and is a very accurate replica of Michael Angelo's statue of Hercules, the national hero of ancient Greece and the founder of the Olympic Games, the most celebrated athletic contests in history.

The Hercules trophy will be shot for annually at the National Matches by teams of two men, *both of whom must be from the same rifle club.*

The match will consist of two sighting shots and twenty shots for record at 100 yards on the standard N. R. A. target, and two sighting shots and twenty shots for record on the C-5 target at 200 yards; all shooting prone and slow fire.

Conditions: Any .22 rifle and any sight, including the telescope.

The names and score of the winning team will be inscribed on a medallion placed in the base of the trophy each year and the winners will receive suitable gold medals selected and presented by the Hercules Powder Company.

If small-bore shots who expect to go to the National Matches will form themselves into two-man teams, and do a little preliminary practice over this course, it will be a big advantage to them when they finally make the effort to be the first team to have their names inscribed on the Hercules trophy.

SQUAW CAMP.

EACH year has seen the Squaw Camp growing a little larger. This September the number of unattached civilians at Camp Perry is going to be larger than it has ever been. These men are going to Camp Perry as a vacation trip, and naturally enough, they want to take their families with them the same as on any other vacation trip. The Squaw Camp will be, as usual, along the lake front and around the club house. Some of the tents will be equipped with electric lights and side-walls. They will all be floored. The tent, cots, and blankets will be available for all competitiors who have their wives with them, at a price of ten dollars for the entire period of the Camp. Meals may be secured in the club house, in any of the various lunch rooms on the reservation, or in the competitors' Mess. All the tents are but a few yards from the bathing beach. Any N. R. A. member who woud like to make the Camp Perry trip, but who has been holding off because he cannot take his family, or for fear they will not be properly taken care of, may go ahead with preparations for the trip. There will be plenty of companions of her own sex for his wife, good meals, and a comfortable place to sleep.

A SWISS STORY.

ALMOST casual glance at the following tabulation of the team scores in each position, the aggregate team scores, and the present world's record in the International Free Rifle Matches, will indicate why the victory of the American team in 1921 and again in 1922 proved such a blow to the Swiss. The story of the International Matches since 1898 has been almost entirely a story of Swiss winnings. The present established world records are in every instance but two held by Switzerland or Swiss riflemen.

Small wonder, then, that such elaborate preparations are being made for the selection of the American team this year. With the matches to be fired in this country, it is hoped that the Americans will be able to hang up new records for the riflemen of Europe to shoot at during the next nine years, when the International Matches will be held abroad. Nor is it a flight of the imagination to say that if the Argentine trophy is to be retained in this country another year, a world's team rec-

ord will have to be established. The Swiss have felt keenly the appropriation of two chapters of their story of the International Matches by the Americans, and they do not intend to let another page be headed with the American Eagle if they can help it.

RIFLE TEAM SCORES

	Place	Date	Champion	Points
1	Lyon	(1897)	Switzerland	4,343
2	Turin	(1898)	France	4,447
3	LaHaye	(1899)	Switzerland	4,528
4	Paris	(1900)	Switzerland	4,399
5	Lucerne	(1901)	Switzerland	4,567
6	Rome	(1902)	Switzerland	4,484
7	Buenos-A.	(1903)	Switzerland	4,598
8	Lyon	(1904)	Switzerland	4,542
9	Brussels	(1905)	Switzerland	4,737
10	Milan	(1906)	Switzerland	4,716
11	Zurich	(1907)	Switzerland	4,848
12	Vienne	(1908)	Switzerland	4,616
13	Hambourg	(1909)	Switzerland	4,840
14	Loosduinen	(1910)	Switzerland	4,916
15	Rome	(1911)	Switzerland	5,014
16	Bayonne-Biarritz	(1912)	Switzerland	5,172
17	Camp Perry, Ohio, U.S.	(1913)	Switzerland	4,959
18	Viborg	(1914)	Switzerland	5,025
19	Lyon	(1921)	U. S. of America	5,015
20	Milan	(1922)	U. S. of America	5,132

TEAMS' SCORES—STANDING

	Place	Date	Champion	Points
1	Lyon	(1897)	Norway	1,436
2	Turin	(1898)	France	1,361
3	LaHaye	(1899)	Switzerland	1,426
4	Paris	(1900)	Switzerland	1,409
5	Lucerne	(1901)	Austria	1,412
6	Rome	(1902)	France	1,351
7	Buenos-A.	(1903)	Italy	1,386
8	Lyon	(1904)	France	1,410
9	Brussels	(1905)	Belgium	1,623
10	Milan	(1906)	France	1,500
11	Zurich	(1907)	Switzerland	1,533
12	Vienne	(1908)	France	1,464
13	Hambourg	(1909)	France	1,575
14	Loosduinen	(1910)	Switzerland	1,532
15	Rome	(1911)	Switzerland	1,588
16	Bayonne-Biarritz	(1912)	Switzerland	1,627
17	Camp Perry, Ohio, U. S.	(1913)	Switzerland	1,575
18	Viborg	(1914)	Switzerland	1,574
19	Lyon	(1921)	Switzerland	1,561
20	Milan	(1922)	Switzerland	1,611

TEAM SCORES—KNEELING

	Place	Date	Champion	Points
1	Lyon	(1897)	Switzerland	1,530
2	Turin	(1898)	Italy	1,516
3	LaHaye	(1899)	Switzerland	1,559
4	Paris	(1900)	Switzerland	1,500
5	Lucerne	(1901)	Switzerland	1,613
6	Rome	(1902)	Switzerland	1,639
7	Buenos-A.	(1903)	Switzerland	1,699
8	Lyon	(1904)	Switzerland	1,623
9	Brussels	(1905)	Switzerland	1,600
10	Milan	(1906)	Switzerland	1,620
11	Zurich	(1907)	Switzerland	1,650
12	Vienne	(1908)	Switzerland	1,625
13	Hambourg	(1909)	Switzerland	1,671
14	Loosduinen	(1910)	Switzerland	1,717
15	Rome	(1911)	Switzerland	1,719
16	Bayonne-Biarritz	(1912)	Switzerland	1,778
17	Camp Perry, Ohio, U. S.	(1913)	Switzerland	1,703
18	Viborg	(1914)	Switzerland	1,730
19	Lyon	(1921)	Switzerland	1,670
20	Milan	(1922)	Switzerland	1,724

TEAM SCORES—PRONE

	Place	Date	Champion	Points
1	Lyon	(1897)	Switzerland	1,500
2	Turin	(1898)	France	1,581
3	LaHaye	(1899)	Italy	1,577
4	Paris	(1900)	France	1,552
5	Lucerne	(1901)	France	1,627
6	Rome	(1902)	Italy	1,535
7	Buenos-A.	(1903)	Switzerland	1,643
8	Lyon	(1904)	Italy	1,570
9	Brussels	(1905)	Switzerland	1,656
10	Milan	(1906)	France	1,626
11	Zurich	(1907)	France	1,662
12	Vienne	(1908)	Italy	1,628
13	Hambourg	(1909)	France	1,700
14	Loosduinen	(1910)	France	1,721
15	Rome	(1911)	Switzerland	1,707
16	Bayonne-Biarritz	(1912)	Switzerland	1,767
17	Camp Perry Ohio, U. S.	(1913)	Switzerland	1,681
18	Viborg	(1914)	Switzerland	1,721
19	Lyon	(1921)	U. S. of America	1,849
20	Milan	(1922)	U. S. of America	1,842

International Tryouts

THE very general interest of riflemen throughout the country in the International Team of last year resulted in the development of a plan for regional tryouts all over the country to assist in the selection of the 1923 International Free Rifle Team and to give riflemen an opportunity to show what they can do under free rifle conditions, regardless of where they might live.

The following list of posts has been selected for the tryouts:

Camp Devens, Ayre, Mass.
Wakefield, Mass.
Fort Niagara, New York.
Sea Girt, New Jersey
Camp Meade, Maryland
Annapolis, Maryland
Quantico, Virginia
Camp McClellan, Anniston, Alabama.
Fort Benning, Georgia.
Fort Bliss, Texas.
Camp Perry, Ohio.
Fort Sheridan, Chicago, Illinois.
Fort Snelling, Minnesota.
Fort Riley, Kansas.
Fort Des Moines, Iowa.
Fort Sam Houston, Texas.
Fort Logan, Colorado.
Fort Benj. Harrison, Indianapolis, Ind.
Fort Crook, Nebraska.
Camp Harry S. Jones, Douglas, Arizona.
*Fort Logan, Utah.
*Presidio of San Francisco, Cal.
*Fort Rosecrans, California.
*Fort Lawton, Seattle, Wash.
*Fort D. A. Russell, Cheyenne, Wyoming.

*Tentative.

The tryouts will be held August 13-15, inclusive, under the supervision of officers detailed by the Corps Area Commanders or by the Commanding Officer of the separate posts at which service teams are in training. The range will be 300 yards. Any ammunition. Any rifle. Any metallic sights. 40 shots standing, 30 shots kneeling and 10 shots prone to be fired each day for three consecutive days. The standard 300-metre international target will be used.

Complete reports of the international preliminary trpouts will be submitted by the Corps Areas and candidates giving promise of international team ability will be selected by Committee, consisting of the 1923 International Team Captain Major L. W. T. Waller, Jr., U. S. M. C., the Director of Civilian Marksmanship; Colonel C. E. Stodter, U S. A., and the first vice-president of the National Rifle Association, Lt. Colonel Frank Maloney. The men so selected will be ordered to Camp Perry and transportation and subsistence paid.

Final details will be published in the August 1st issue.

REVOLVER and PISTOL

	Place	Date	Champion	Points
1	Paris	(1900)	Switzerland	2,271
2	Lucerne	(1901)	Switzerland	2,159
3	Rome	(1902)	Switzerland	2,187
4	Buenos-A.	(1903)	Argentina	2,169
5	Lyon	(1904)	Switzerland	2,333
6	Brussels	(1905)	Belgium	2,486
7	Milan	(1906)	Belgium	2,425
8	Zurich	(1907)	Belgium	2,398
9	Vienne	(1908)	Italy	2,438
10	Hambourg	(1909)	Germany	2,509
11	Loosduinen	(1910)	Belgium	2,481
12	Rome	(1911)	Belgium	2,473
13	Bayonne-Biarritz	(1912)	Belgium	2,570
14	Camp Perry, Ohio, U. S.	(1913)	U. S. of America	2,325
15	Viborg	(1914)	Italy	2,518
16	Lyon	(1921)	Italy	2,469
17	Milan	(1922)	Switzerland	2,553

INTERNATIONAL RECORDS

Rifle

Teams

Aggregate	Switzerland 1912		5,172x6,000
Standing	Switzerland 1912		1,627x2,000
Kneeling	Switzerland 1912		1,778x2,000
Prone	U. S. A. 1921		1,849x2,000

Individuals

Aggregate	C. Staheli 1912		1,078x1,200
Standing	Rene George 1914		348x 400
Kneeling	C. Staheli 1912		374x 400
Prone	Walter Stokes 1921		372x 400

INTERNATIONAL RECORDS

Revolver

Teams

Aggregate	Belgium 1912		2,570x3,000

Individuals

Aggregate	VanAsbrook 1912		540x 600

SPECIAL RATES APPLY TO ALL MEMBERS OF THE FAMILY.

N connection with the plans of riflemen for taking their families to Camp Perry, it should be noted that the special fare and half-fare certificate plan rates apply to all dependent members of the rifleman's family. Certificates should be obtained for the wife and each child, including such children as are entitled to travel for half the regular fare.

SCHEDULE OF MATCHES ANNOUNCED

THE following index to competitions covers the entire match period from September 1st to 27th, and indicates the entry closing dates of the various matches, as well as the dates on which the matches are to be fired.

INDEX TO COMPETITIONS

Saturday, September 1, 1923

Teams report and are assigned to groups for quarters and instructors. Competitors draw equipment and get settled in camp.

Sunday, September 2, 1923

Competitors clean equipment and familiarize themselves with camp layout.

Monday, September 3,1923 to

Monday, Sept. 3 to Monday, Sept. 10, inc.

Rifle and Pistol Instruction under group instructors and Range Practice.

Saturday, September 8, 1923

8:00 P. M. Entries close: Leech Cup and and Members Matches.

Sunday, September 9, 1923

8:00 P. M. Entries close: Navy, NRA Rapid Fire (200 yds.) NRA Rapid Fire (300 yds.) NRA Rapid Fire Championship and NRA Individual Free Rifle Matches.

Monday, September 10, 1923

8:00 P. M. Entries Close: Marine Corps, Presidents, Enlisted Men's Team, Individual Civilian Club Members, ROTC Team, C. M. T. C. Team, All-round Championship and NRA Grand Aggregate Matches.

Tuesday, September 11, 1923

Time	Event	Range
7:30 A. M.	Leech Cup Match	800 S. F.
1:30 P. M.	Leech Cup Match	900 S. F.
1:30 P. M.	Members Match	600 S. F.

Entire Day: All Re-Entry, Small Bore Matches, all Re-Entry Pistol Matches, Shotgun School of Instruction, Expert Medal Matches, Targets for School of Instruction and Practice.
Announcement made on Bulletin Board showing time for use and number of targets available at the several ranges.

8:00 P.M. Entries Close: Small Bore Wimbledon, and Small Bore Individual Short Range Matches.

Wednesday.. September 12, 1923

Time	Event	Range
7:30 A. M.	Navy Match	200 S. F.
7:30 A. M.	NRA Rapid Fire Match	200 R. F.
7:30 A. M.	NRA Ind.FreeRifle	Int. Range
1:30 P. M.	Leech Cup Match	1000 S.F.
1:30 P. M.	NRA Rapid Fire Match	300 R.F.

Entire Day: All Re-Entry Small Bore Matches, all re-entry Pistol Matchts, Shot Gun School of Instruction, Expert Medal Matches, Targets for School of Instruction and Practice.
Announcement made on Bulletin Board showing time for use and number of targets available at the several ranges.

8:00 P. M. Entries Close: Championship Regimental Team, Camp Perry Instructors Match, Adjutants General Match and Small Bore Individual Long Range Match.

Thursday, September 13, 1923

Time	Event	Range
7:30 A. M	President's Match	200 S. F.
7:30 A. M.	Marine Corps Match	600 S. F.
1:30 P. M.	Enlisted Men's Team Match	200 S. F.
1:30 P. M.	Ind. Civilian Club Members' Match	200 S. F.
1:30 P. M.	C.M.T.C. Team Match	200 S. F.
1:30 P. M.	R.O.T.C. Team Match	200 S. F.
3:30 P. M.	Enlisted Men's Team Match	600 S. F.
3:30 P. M.	Individual Civilian Club Members' Match	600 S. F.
3:30 P. M.	C.M.T.C. Team Match	600 S. F.
3:30 P. M.	R.O.T.C. Team Match	600 S. F.

Entire Day: All Re-Entry Small Bore Matches, all re-entry Pistol Matches, Shotgun School of Instruction, Expert Medal Matches, Targets for School of Instruction and Practice. Announcement made on Bulletin Board showing time for use and number of targets available at the several ranges.

8:00 P. M. Entries Close: International Small Bore Team (Dewar Trophy) Tryout. Small Bore Two-Man Team and Small Bore Interclub Team Matches.

Friday, September 14,1923

Time	Event	Range
7:30 A. M.	President's Match	600 S. F.
7:30 A. M.	Marine Corps Match	1000 S. F.
7:30 A. M.	Small Bore Individual Short Range Match	S.B.Range
1:30 P. M.	President's Match cont.	600 S. F.
1:30 P. M.	Marine CorpsMatchcont.	1000 S.F.
1:30 P. M.	Small Bore Wimbledon Match	S. B. Range

Entire Day: All Re-Entry Small Bore Matches, all Re-Entry Pistol Matches, Shotgun School of Instruction, Expert medal matches, Targets for School of Instruction and Practice. Announcement made on Bulletin Board showing time for use and number of targets available at the several ranges.

RE-ENTRY PISTOL MATCHES TERMINATE THIS DATE.

8:00 P. M. Entries Close: Wimbledon Match, Herrick Trophy Team Match, and Small Bore NRA Individual Championship.

Saturday, September 15, 1912

Time	Event	Range
7:30 A. M.	President's Match	1000 S. F.
7:30 A. M.	Camp Perry Instructor's Match (Unsquadded)	50 yd. pistol
7:30 A. M.	Small Bore Individual Long Range Match	S.B.Range
	International Small Bore Team (Dewar) Tryout	S.B. Range
1:30 P. M.	President's Match, cont.	1000 S.F.
1:30 P. M.	Camp Perry Instructors Match (unsquadded)	200 S. F.
1:30 P. M.	The Adjutants General Match	200 S. F.
1:30 P. M.	Championship Regimental Team Match	200 S. F.
1:30 P. M.	International Small Bore Team (Dewar) Trophy tryout continued	S. B. Range
3:00 P. M.	The Adjutant General Match	600 S. F.
3:00 P. M.	Championship Regimental Team Match	600 S. F.

All Day: All Re-Entry small bore matches, expert medal matches, Practice targets as announced on Bulletin Board. Last day of shotgun instruction. Unsquadded single entry pistol matches begin.

8:00 P. M. Entries Close: AEF Roumanian Trophy and Port Clinton Trophy Matches

Sunday, September 16, 1923

Time	Event	Range
7:30 A. M.	Small Bore Interclub Team Match	Small Bore Range
7:30 A. M.	Small Bore Two-Man Team Match	Small Bore Range
7:30 A. M.	Small Bore International Team (Dewar) trophy tryout	Small Bore Range

Entire Day: All ranges closed except small bore, shotgun and International.

8:00 P. M. Entries Close: Infantry Team, Free Rifle (200 yards) Free Rifle (600 yds.) Small Bore East and West Team Match Small Bore Short Range Team and Individual Palma Matches.

Monday, September 17, 1923

Time	Event	Range
7:30 A. M.	Wimbledon Cup Match	1000 S. F.
7:30 A. M.	Small Bore NRA Individual Championship Match	Small Bore Range
7:30 A. M.	International Military Rifle Match	Int. Match Range
1:30 P. M.	Wimbledon Cup Match continued	1000 S. F.
1:30 P. M.	Herrick Trophy Match	800 S. F.
3:00 P. M.	Entries Close: Police Pistol Team Match.	
4:00 P. M.	Police Pistol Team Match	Pistol Range

Entire Day: All re-entry Small Bore Events, expert medal match, unsquadded single entry pistol matches. Targets for practice as announced on Bulletin Board.

8:00 P. M. Entries close for National Individual Rifle Match.

Tuesday, September 18, 1923

Time	Event	Range
7:30 A. M.	Herrick Trophy Match	900 S. F.
7:30 A. M.	AEF Roumanian Trophy Match	200 S. F.
7:30 A. M.	Port Clinton Trophy Match	200 S. F.
7:30 A. M.	International Free Rifle Team Match	Int. Range
1:30 P. M.	Herrick Trophy Match	1000 S.F.
1:30 P. M.	AEF Roumanian Trophy Match	600 S. F.
1:30 P. M.	Port Clinton Trophy Match	600 S. F.

Entire Day: All re-entry Small Bore events, expert medal match, unsquadded single entry pistol matches, targets for practice as announced on the Bulletin Board.

8:00 P. M. Entries Close: National Individual Pistol Match.

Wednesday, September 19, 1923

Time	Event	Range
7:30 A. M.	Small Bore East and West Team Match	S. B.
7:30 A. M.	Free Rifle Match	200
7:30 A. M.	Individual Palma Match	800
7:30 A. M.	Infantry Team Match (Field Firing)	
8:30 A. M.	Individual Palma Match	900
1:30 P. M.	Infantry Team Match, cont'd	
1:30 P. M.	Individual Palma	900 & 1000
1:30 P. M.	Small Bore Short Range Team Match	S. B. Range
3:30 P. M.	Free Rifle Match	600

Entire Day: LAST DAY OF UNSQUADDED SINGLE ENTRY PISTOL MATCHES. All re-entry small bore events, expert medal match. Targets for practice as announced on the Bulletin Board.

LAST DAY OF EXPERT MEDAL MATCHES

8:00 P. M. Entries Close: National Pistol Team, NRA Pistol Team and Palma Trophy Team, United Service Team, and Shotgun Team Matches.

Thursday, September 20, 1923

Time	Event	Range
7:30 A. M.	National Individual Rifle Match	200 S. F. (200 range)
8:30 A. M.	National Individual Rifle Match	200 R. F. (600 range)
9:30 A. M.	National Individual Rifle Match	300 R. F. (800 range)
10:30 A.M.	National Individual Rifle Match	600 S. F. (1000 range)
1:30 P. M.	National Individual Rifle Match	200 R. F. (600 range)
	National Individual Rifle Match	300 R. F. (800 range)
	National Individual Rifle Match	600 S. F. (1000 range)

Friday, September 21, 1923

Time	Event	Range
7:30 A. M.	National Individual Rifle Match	600 S. F. 600 range
7:30 A. M.	National Individual Rifle Match	1000 S. F. 1000 range
7:30 A. M.	National Individual Pistol Match	All ranges 200 range
1:30 P. M.	National Individual Rifle Match, continued.	
1:30 P. M.	National Individual Pistol Match, continued.	
8:00 P. M.	Entries Close: Camp Perry Shotgun Championship	

Saturday, September 22, 1923

Time	Event	Range
7:30 A. M.	National Pistol Team Match	200 yds. range
7:30 A. M.	NRA Pistol Team Match	200 yds. range
7:30 A. M.	Palma Trophy Team Match	All ranges noted
1:30 P. M.	United Service Team Match	All ranges noted
1:30 P. M.	Shotgun Team Match	Shotgun Traps

Sunday, September 23, 1923

Time	Event	Range
7:30 A. M.	Small Bore Int. Team Match (Dewar Trophy)	S. B. Range
7:30 A. M.	Registered Shotgun Tournament	
8:00 P. M.	Entries Close: National Rifle Team Match	

Monday, September 24, 1923

Time	Event	Range
7:30 A. M.	National Rifle Team Practice at ranges as noted on Bulletin Board.	
7:30 A. M.	Camp Perry Shotgun Championship Match	Shotgun Traps

Tuesday, September 25, 1923

Entire Day: National Rifle Team Practice at ranges noted on Bulletin Board.

Wednesday and Thursday, Sept. 26-27, 1923

Entire Day and until finished, National Rifle Team Match.

Military Marksmanship
in Relation to Eyes, Race and other Factors

By Col. W. P. Chamberlain and Maj. Albert J. Love, Medical Corps, U. S. A.

PART 2

Relation of Nativity to Color of Eyes

Marksmanship is perhaps more dependent upon nativity than upon the color of eyes. It is consequently of interest in this connection to consider the color of the eyes among soldiers of different nationalities who have qualified in marksmanship. This information is contained in Table 8. Since Americans formed the bulk of all those who qualified, it is to be expected that the proportion of the blue eyes to the brown eyes among them will be practically the same as that for the total, as shown in Table 1. This assumption we find to be correct. Thus, among all those who qualified 605 per 1,000 had blue eyes, and among Americans, 604. From Table 8 we see that the races which were predominantly blue eyed, reading from the highest down, were Scandinavians, Irish, Scotch, and Danish; while those among which brown eyes predominated were French and Italians. The proportion of the Russians who were brown eyed was above the average; this was also the case among the Canadians. due probably to the inclusion of the French Canadians, and among the Austrians as a result of including Slavonic races of the then Austria-Hungary.

In this connection it is of interest to note how these results compare with the proportion of blue eyes and brown eyes in the European races, as published in "Army Anthropology" (2). There we find the following:

From a comparison of Tables 8 and 9 it is apparent that the proportions are practically the same, with the exception of the distribution for the French. The inference to be drawn from this difference is that apparently a larger proportion of French with the Nordic element were included in the "Army Anthropology" statistics, while a large proportion of those with the Celtic element were included in the marksmanship statistics.

Nativity in Relation to Character of Qualification

The character of qualification among soldiers of different nativities presents some points of interest. These data are shown in Table 10 and indicate that apparently the color of eyes had little effect upon qualification. Thus the relative numbers of the brown-eyed French and of the blue-eyed Scandinavians were very similar.

Some approximation regarding the number of the men of the different nationalities who were in the military service during the years under consideration can be obtained from the tables showing enlistments by nativities in Annual Reports of the Surgeon General of the Army (3) for the years 1908 to 1911. The aggregates obtained from the tables were divided by four to reduce them to a one-year basis. Using these strengths as divisors, the ratios shown in Table 11 were computed. The race which had the greatest relative number qualifying is placed at the top of the table, and that with the least number, at the bottom.

From this table we see again that in marksmanship the color of eyes was of little importance as compared with that of race. Thus the largest proportion of the blue-eyed Scandinavians qualified in the total of the three grades, while the brown-eyed French and Italians stood second and third. A much larger proportion of the blue-eyed Scandinavians, however, qualified as expert riflemen, the proportion of them to the Italians in this grade being practically as 7 is to 1; while the Danish, who had the smallest percentage of men qualifying in the three grades, had a greater proportion qualifying as expert riflemen than did the Italians, who stood third for the totals.

Visual Acuity in Relation to Color of Eyes

Table 12 exhibits the relationship between color of eyes and visual acuity, right eye and left eyes separately. From Section B of this table it is apparent that the men with acuity of 20/20 were characterized by the same proportion of blue eyes and brown eyes as was the general male population. It is also apparent that there was little difference in the visual acuity of the right and left eye.

Visual Acuity in Relation to the Character of Qualification

Circular No. 5 (4), which was published by the War Department under date of January 25, 1908, gave in detail the result of a series of experiments conducted by Lieut. Col. J. M. Banister and Maj. Henry A. Shaw, stating among other points "That a visual acuity of 20/40, or even 20/70, in the aiming eye is consistent with good shooting, provided that the soldier is able to accurately focus the sights of his rifle." As a result of these observations, the requirements for enlistment in the line of the Army and in the Signal Corps were reduced to 20/40 for the better eye and 20/100 for the poorer eye, provided that no organic diseases existed in either eye (Circular No. 4, Jan. 24, 1908). Maj. Roderic P. O'Conner, M. C., U. S.

TABLE 8.—COLOR OF EYE BY NATIVITY

Nativity	Absolute numbers			Distribution per 1,000	
	Blue	Brown	Total	Blue	Brown
American	2,845	1,863	4,708	604.29	395.70
Austrian	44	44	88	500.00	500.00
Canadian	19	13	32	593.74	406.25
Danish	8	3	11	727.27	272.73
English	23	14	37	621.62	378.38
German	83	42	125	664.00	336.00
Hungarian	19	11	30	633.33	366.67
French	1	7	8	125.00	875.00
Irish	92	28	120	766.66	233.33
Italian	5	22	27	185.18	814.81
Russian	49	42	91	538.46	461.54
Scandinavian	79	10	89	887.64	112.36
Scotch	6	2	8	750.00	250.00
Other	73	73	146	500.00	500.00
Total	3,346	2,174	5,520	606.16	393.84

TABLE 9.—PROPORTION OF BLUE EYES TO BROWN EYES IN THE EUROPEAN RACES
("Army Anthropology," Table 127, p. 284)

Races	Distribution per 1,000	
	Blue	Brown
English	660.94	339.06
Germans	646.83	351.17
French	491.25	508.75
Irish	732.91	267.09
Italians	203.10	796.90
Scotch	713.50	286.50

TABLE 10.—CHARACTER OF QUALIFICATION BY NATIVITY

Nativity	Absolute numbers				Distribution per 1,000		
	E. R.	S. S.	M. M.	Total	E. R.	S. S.	M. M.
American	372	2,059	2,260	4,691	79.30	438.93	481.77
Austrian	7	41	38	86	81.40	476.74	441.86
Canadian	6	12	14	32	187.50	375.00	437.50
Danish	1	5	5	11	90.90	454.55	454.55
English	4	13	20	37	108.11	351.36	540.54
German	5	56	62	123	40.65	455.28	504.07
Hungarian	2	13	15	30	66.67	433.33	500.00
French	1	2	5	8	125.00	250.00	625.00
Irish	14	50	57	121	115.70	413.22	471.07
Italian	1	7	20	28	35.71	250.00	714.29
Russian	3	37	45	85	35.29	435.29	529.41
Scandinavian	12	43	35	90	133.33	477.78	388.89
Scotch	1	9	4	14	71.42	642.86	285.71
Other	5	40	100	145	34.48	275.86	689.65
Total	434	2,387	2,680	5,501	78.89	433.92	487.18

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Army, who disagreed with the findings of the board, published an extensive article upon the subject in the *Journal of the Military Service Institute of the United States* (5).

A small amount of material which may have some bearing upon this subject has been assembled in Table 13. It is apparent in this table that, for both the right and left eye, the ability to qualify in the higher grades of marksmanship diminishes as the visual acuity decreases; this is true practically throughout for the sharpshooter class and until a visual acuity of 20/50 is reached for the expert riflemen. Among these latter (expert riflemen) there is a comparatively small number of men with a visual acuity of 20/50 or less. Possibly this group may have consisted largely, if not entirely, of officers whose visual acuity was corrected to normal by the use of glasses.

Color of Hair in Relation to Color of Eyes

While the relationship of hair color to eye color is somewhat foreign to the subject at hand, Table 14 is introduced because it contains some material which may be of value in showing that so far as color of eyes and hair is concerned, the soldiers qualifying in marksmanship were a true cross-section of the general male population. This table sets forth the already well-known fact that the color of hair and the color of eyes are closely related. Thus practically all those with flaxen hair who qualified in marksmanship had blue eyes, while nearly all those with brown eyes had dark hair.

TABLE 11.—CHARACTER OF QUALIFICATION BY NATIVITY

Race	Average strength, 1 year	Ratios per 1,000 men in the service[5] E. R.	S. S.	M. M.	Total
Scandinavians	553	21.70	77.75	63.29	162.75
French	68	14.70	29.41	73.53	117.65
Italian	314	3.18	22.29	63.70	89.17
Austrian	986	7.10	41.58	38.54	87.22
American	56,234	6.62	36.62	40.19	83.42
Scotch	170	5.88	52.94	23.53	82.35
Irish	1,632	8.58	30.64	34.92	74.14
Hungarian	452	4.42	28.76	33.19	66.37
German	1,921	2.60	29.15	32.27	64.03
Russian	1,331	2.25	27.80	33.81	63.86
Canadian	555	10.81	21.62	25.23	57.66
English	766	5.22	16.97	26.11	48.30
Danish	237	4.22	21.10	21.10	46.42
Others	599	8.25	66.77	166.94	242.07
Total	65,816	6.59	36.27	40.72	83.58

[5] The absolute number for each nativity and for the total is shown in Table 10.

TABLE 12.—RELATION OF EYE COLOR TO VISUAL ACUITY AMONG SOLDIERS QUALIFYING IN MARKSMANSHIP

Visual acuity	Section A. Absolute numbers: Blue eyes R. E.	Blue eyes L. E.	Brown eyes R. E.	Brown eyes L. E.	Total R. E.	Total L. E.	Section B. Distribution per 1,000 to eye color: Blue eyes R. E.	Blue eyes L. E.	Brown eyes R. E.	Brown eyes L. E.
20/20	3,182	3,155	2,073	2,081	5,255	5,236	605.52	602.56	394.48	397.44
20/30	130	129	92	72	222	201	585.58	641.79	414.41	358.21
20/40	26	37	17	14	43	51	604.65	725.49	395.35	274.51
20/50	10	11	8	11	18	22	555.55	500.00	444.44	500.00
20/70	11	17	5	9	16	26	687.50	653.85	312.50	346.16
20/100	3	13	-----	6	3	19	1,000.00	684.21	-----	315.79
Total	3,362	3,362	2,195	2,193	5,557	5,555	605.00	605.22	395.00	394.78

TABLE 13.—CHARACTER OF QUALIFICATION BY VISUAL ACUITY

Visual acuity	Absolute numbers: E. R. R.E.	E. R. L.E.	S. S. R.E.	S. S. L.E.	M. M. R.E.	M. M. L.E.	Total R.E.	Total L.E.	Distribution per 1,000: E. R. R.E.	E. R. L.E.	S. S. R.E.	S. S. L.E.	M. M. R.E.	M. M. L.E.
20/20	422	413	2,302	2,291	2,510	2,511	5,234	5,215	80.62	79.19	439.82	439.31	479.56	481.50
20/30	15	19	76	73	132	109	223	201	67.26	94.53	340.81	363.18	591.93	542.29
20/40	1	3	11	15	31	34	43	52	23.26	57.69	255.81	288.46	720.93	653.85
20/50	2	3	4	2	12	17	18	22	111.11	136.36	222.22	90.91	666.66	772.73
20/70	2	2	3	10	11	14	16	26	125.00	76.92	187.50	384.62	687.50	538.46
20/100	---	2	----	4	3	13	3	19	-----	105.26	-----	210.53	1,000.00	684.21
Total	442	442	2,396	2,395	2,699	2,698	5,537	5,535	79.82	79.85	423.73	432.70	487.45	487.44

TABLE 14.—RELATIONSHIP BETWEEN EYE COLOR BY HAIR COLOR

Hair color	Absolute numbers: Blue	Brown	Total	Distribution per 1000: Blue	Brown
Flaxen	133	10	143	930.07	69.93
Red	96	23	119	806.72	193.27
Light brown	1,248	327	1,575	792.38	207.62
Medium brown	1,650	1,223	2,873	574.31	425.69
Dark brown	136	578	714	190.48	809.52
Gray	98	27	125	784.00	216.00
Total	3,361	2,188	5,549	605.69	394.30

Conclusions

1. One of the most important factors in a soldier's ability to qualify in military marksmanship is his length of service, the increase in percentage of successful qualifications, particularly in the higher grades, probably depending upon the training received.

2. The percentage of those qualifying in the highest grade increases with age, depending apparently upon the increase in length of service.

3. A higher percentage of officers and noncommissioned officers qualifies in the grade of expert riflemen, due apparently to greater length of service, as well as possibly in part to superior general physique.

4. A larger percentage of Negroes than of Whites qualifies in military marksmanship, due probably to a greater length of service among the former. However, a larger ratio of Whites qualified as expert riflemen, this circumstance probably resulting from the inclusion among them of commissioned officers (all white) and a relatively greater proportion of the higher grades of noncommissioned officers.

5. Apparently the South Europeans qualify in military marksmanship as readily as do the North Europeans, though a larger percentage of the latter qualified in the grade of expert riflemen.

6. Based on the small amount of data available, apparently the ability to qualify in the higher grades of military marksmanship decreases as visual acuity diminishes, the only exception being among officers, who may have worn glasses correcting refractive errors.

7. The proportion of blue eyes to brown eyes among soldiers qualifying in military marksmanship did not differ from that in the general male population as represented in the Army during the World War.

8. The proportion of blue eyes to brown eyes was the same among soldiers of the different races and nativities who qualified in military marksmanship as among the same groups in the general male population as represented in the Army during the World War.

9. The proportion of blue eyes to brown eyes among those with normal vision who qualified in military marksmanship was the same as in the general male population as represented in the Army during the World War.

10. The relation of color of hair to color of eyes among those qualifying in military marksmanship was the same as in the general male population as represented in the Army during the World War.

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Mechanical Hints for Riflemen

By "Trim Nat"

THE article by Ernest Coler in February 15th issue, as to whom is due the invention and design of the sights now in use by the Marine Corps and many others and wrongfully termed "Marine Corps Sights," seemed to have done some good at least, in the case of "M. H. Abrams," who in the issue of Arms & The Man, for March 15th inst., states he is going to resight all the rest of his firearms with these forms of hights. Like our friend, Horace Kephart, when he got his new 1919 Bolt-action Savage rifle .22/5/40 and saw that foresight, it did not take him long to make up his mind as to what a good sight it was.

But friend Abrams rather "fell off the log backwards" when he came to the bluing part of his work, and so I am going to publish the original formulae and notes, as used by me in all my sight-making, nearly ever since Col. Buffington first used it at the Springfield Armory, to blue all the reconstructed .45 cal. Springfield M.-Loaders and the Marine Corps had nothing to do with that. Col. Buffington first described his complete process in the Scientific American; I had the original article, but owing to my many mishaps I have mislaid it. Our friend, Harry Pope, when he had set up in business for himself, at Ashley Street, Hartford, Conn., first sent to me the working formulae here described and I have used it ever since without a single failure.

FORMULA

Take *one* (1) part Black Oxide of Manganese and *ten* (10) parts of refined Nitre (commonly called "salt-petre"), by avoirdupois weight, and having a sound iron pot for a crucible, SLOWLY fuse the Nitre first, then add the Black Oxide of Manganese, keeping the mixture well stirred when in use, with a flat-ended rod of clean steel or iron. When the mixture is ready to use, it will just ignite a dry pine splinter; it will do this just before it reaches a red-heat. Try at all times to maintain this correct heat and do not overheat at any time.

Wire the articles to be colored with small steel or iron wire for the purpose of handling; they may also be hung from a hook, or in a wire basket, that will allow the top to go well below the surface of the mixture, but the wire-hook is the handiest; keep the mixture well stirred and articles constantly in motion, that an even action may result; examine from time to time and if not colored to suit—reheat until they are. The time depends on the size and amount of metal in the article; let the heat be constant, not overheated.

When the deep-blue-black is reached, remove the articles and quickly quench in clean *cold* water to remove the excess of mixture, then dip in clean water *that is boiling*, shake the warm water off and when thoroughly dry, drop them into clean Lard-Oil or "3 In 1" will do; have the lard-oil of the best grade. This is to deepen the color, cool them and prevent any chance of rust.

For reasons given below, be sure that the articles to be colored are free from water, oil, etc. They must be *absolutely clean.*

Points that must be observed to *avoid trouble.*

The pot or crucible must be a sound one, of cast-iron, or preferably steel-pressed, so it will not leak, or crack and let the contents in the fire. It is just as inflammable as hot oil, if it gets in the fire, it will burn and give off dense black smoke, but when properly used, there are no fumes to mention.

When melted, it will first reduce to about one-third of its loose bulk and black, but when it is cold, it will be solid and white, very much like Cyanide of Potash, for which it might be mistaken. The mixture can be re-used until it is worn out, or gets too small in quantity, when it can be renewed by the addition of proportionate amounts as before, being sure it is by weight only.

When remelting, heat very slowly, as the mixture will melt at the bottom first and might blow the top crust out of the pot. An even heat is the proper one at all times. A *loose* flat cover until it is melted, to keep dirt out, but be sure it is *not* so tight that it sticks down; keep pot covered nearly all the time, either to retain heat, or keep out the dirt. Have the pot deep for its diameter, and do not carry the mixture very high, as it may creep up the inside and so over into the fire.

Do not let oil or water get in the mivture, as one catches fire and water will sputter as if dropped on melted lead, but there is no danger at all, if proper care is taken, any more than when melting lead.

A good working Bunsen burner will furnish a cheap, clean and handy means of heating small articles such as sights, etc. I rarely had need to use more, but Col. Buffington held the Krag barrels upright in the cast-iron pot that was used at Springfield Armory and used smaller pots for sight, receivers, etc.

It is a very easy and rapid method of doing the work and if done a million times, will always result the same, leaving the articles in the mixture will cause no harm; on the contrary avoid underheating. A very few trials gives full control of all points and any one can use, but note that this is for steel and fine wrought-iron only, cast-iron or malleable-iron (so-called) require a different treatment.

There are many who wish to do a little tinkering with their rifles, or the other parts of their outfits, but not knowing how to make joints, or add one part to another, defer the job until some one of greater skill, or more adept in metallurgy, can show them how. There are many jobs of this kind, that are well within the skill of the ordinary man, who will give his mind earnestly to the repair or making of a new part; the day when mechanics were a hidden mystery has gone by and progress demands more of the tyro.

The ordinary methods of uniting metals are known as welding, brazing, (hard and soft) and soldering (hard and soft). Heat is used in melting the junctions, sometimes it is direct from a coal fire, made with charcoal, or well coked bituminous coal; at other times an electric current is used, while otherwise a torch is used, with air blown through alcohol, gasoline, or other combustible liquids which will vaporize readily. Acetylene is a valuable vapor, being very hot, clean and comparatively cheap in cost.

Welding in all its various methods is rather beyond the range of the tyro, and as it is not only more difficult, but rather uncertain in the hands of a beginner, it is perhaps better to take up the easier methods of brazing and soldering, especially as these are in most common use and on nearly all kinds of metals. Soldering is the knack, or art rather, of uniting the surfaces of metals, or alloys, by partial fusion, the solder alloy being either placed or fused between the metals, or harder alloys, it is intended to unite, the solder being more fusible than the metal surfaces which it is intended to unite. Solders and brazing compounds, generally termed "spelter," are known as "hard or soft," being frequently made of silver and gold. Hard solders usually melt at a very high heat, nearly red, while with the softer solders, or alloys, they will melt in boiling water.

One thing is certain, all the surfaces should be chemically clean and no trace of oxide—they are generally protected from the air by some form of a flux, borax, boracic acid, sal-ammoniac, or rosin, being generally used, but other fluxes sometimes take their place.

Hard silver solder is generally composed of four parts of fine silver and one part pure copper, made into an alloy, and is most useful when in sheets as it can be placed in place easier; it fuses with difficulty. Soft silver solder takes two parts of fine silver and one of brass, with sometimes a trace of arsenic, which is added at the moment when the alloy melts. These alloys are mostly run into small bars, or strips for convenience in use. These last silver alloys are used on silver, gold, steel, gun-metal, etc., as it makes a very neat joint when fused with the blow-torch such as in mending band-saws, where it is generally laid between the lapped joints, a thin flux of borax and water with it and the joint held together with heavy tongs until cold, when it is filed into shape. It makes a neater and stronger joint than soft solder. If properly handled, the whole joint is filled completely without any excess of solder; of course the parts must be kept strictly in place until they set.

Button solder, so-called, is composed of tin ten parts, pure copper six and ordinary brass four parts. Brass and the copper are melted first and then the tin is added. When the whole is melted it should be stirred well and poured into cold water to granulate it, then well dried and pulverized in a strong mortar for use. This is called granulated button solder and if two parts of zinc are added to this alloy it makes a much more fusible solder.

Fine gold cut into shreds makes a good solder for joining chemical dishes of platinum. Copper and brass shredded are used for wrought-iron and steel. Hard silver solder works well if reduced to granules and so used with clean borax. In using borax as a flux it is better to heat it until all the water evaporates and then while cold granulate it in a heavy mortar, keep it in a dry, clean bottle, with a parafined cork in it; the cork should be boiled in the parfine.

Soft solder is made of tin two parts and lead one part. An excellent solder for general use is made of pure Banca tin and pure lead equal parts. This is known amongst the trade as "Half and Half Solder," and when well made is the purest material.

The surfaces of metals or alloys to be united should always be perfectly cleaned and then washed with "Muriate of Zinc." This is composed of Chemically Pure (C. P.) Muriatic Acid, with all the clean zinc it will eat up. A slight addition of Sal-Ammoniac on dirty or greasy work improves it and on galvanized iron the pure Muriatic Acid should be used. All soldering irons (so-called, although they are really copper) should at all times be kept well cleaned and tinned to the point. When done using and while they are hot dip them quickly in clean cold water. This will remove all scale and dirt and the remaining heat will dry them. While using them have a parafined rag sprinkled with rosin and wipe all four sides of the copper on that to clean it for the next handling.

Handloading Ammunition

By J. R. Mattern

CHAPTER XX

GAS CHECK BULLETS

NO discussion of handloading or of reduced charges in rifles would be complete without a description of protected-base bullets and an explanation of why and how they are useful and popular. This is true despite the fact that jacketed bullets are available to all shooters at fair prices as this is written. There has been times in the past when jacketed bullets were not available, and such conditions may reappear, and when they do, the gas check bullet is the next best. It will not do everything, but will do more than plain-base bullets, as has been discussed in previous chapters.

John H. Barlow of the old Ideal Manufacturing Company was the designer of the first gas check cups and of the indented-base bullet for carrying them. They date back only to the early days of the 30-caliber cartridges. When they first appeared they were hailed as capable of developing practically full power in the 30-40, the 30-30, 303 Savage, 32-Special and other such cartridges, and many shooters welcomed them on this basis for hunting purposes as well as for target. The idea was freely expressed that they would not wear barrels as fast as jacketed bullets. Some of them were even provided with secondary tips which could be cast of soft lead.

Experience showed, however, that such bullets were not desirable in quick twist rifles for hunting large game on account of their necessary hardness of alloy, which prevented killing expansion. Furthermore, as our knowledge of smokeless powders grew, we found that jacketed bullets were not wearing barrels—it was erosion of the steel by the hot gases which produced the quick wear. Of late years the formulation of powders and the designs of bullets have been so developed that this powder erosion is minimized to the point where many thousands of shots are required in nearly all rifles before a barrel becomes badly worn.

Gas check bullets have persisted in popularity because of other qualities they possess, notably their very low cost in actual coin of the realm where labor of making them is not considered; and beyond that, the fact that they can be manufactured by the individual when no other bullets that will serve their exclusive purposes are available.

The copper cups themselves normally are a product of machinery in the Ideal factory, and are patented, the writer believes. During the war, however, none could be obtained from this source. A call arose for a small hand tool to stamp out the cups at home, and in response the Yankee Specialty Company produced one which is entirely practical and is cheap enough to justify its purchase by every owner of a gas check bullet mold. He may and probably will not want to use it regularly so long as the cups can be purchased of the Ideal Company freely, but use of the hand tool beats doing without cups by a wide margin.

Dr. W. G. Hudson had a good deal to do with developing loads in which these bullets were used. We can not do better here than quote from an article of his on reduced loads in 30-caliber rifles which was published in an Ideal handbook. After stating that a cast-bullet load that will do accurate work up to 100 yards in these rifles was easily produced, and that the difficulty lay in getting a load for longer ranges, he continued:

"My efforts have been directed toward securing as heavy a charge as could be loaded in amunition prepared entirely by the shooter himself, using home-made cast bullets, a suitable load, at nominal cost, and which would be accurate up to, say, 500 or 600 yards. The need for something of this sort is evident.

"Most of us have supposed that the chief obstacle in the way of a cast bullet load in the high power rifle was the stripping caused by the quick twist. But the alloy in general use is sufficiently hard not to strip with any reasonable load. The great obstacle when we attempted to get sufficient energy for midrange shooting is the fusing of the base and sides of the bullet. Fusing is disastrous in many ways; more especially it deforms the base of the bullet, and bullets with bad bases will not shoot well. The fusion has a tendency to extend in streaks up one side of the bullet, often cutting a passage past in it. This puts the bullet badly out of axis with the bore, causing it to take what is fittingly called a "corkscrew" flight.

"These troubles are now happily a thing of the past. Mr. Barlow has devised a method of attaching a shallow metal cup to the base of the bullet, which is so effective in preventing fusion that velocities of 1700 feet per second are obtained, with accuracy at ranges of 600 yards and under which is fully as good as shown by Government cartridges. The superior energy that can be imparted to these protected base bullets gives them such an advantage over the bullets of plain alloy that in my opinion they should entirely supersede the latter for all ranges over 200 yards."

That expression gives the background of gas check bullets. It is too good to be lost. Its facts are somewhat modified by developments in 30-caliber cartridges since it was written, and handloaders will find that nearly always they can get finest accuracy by using our present cheap and excellent jacketed bullets for their midrange loads. Nevertheless, the makings of a gas check bullet for his pet rifle should be in the outfit of every handloader in the form of molds, a supply of Ideal factory cups and a Yankee tool for stamping others in case of need.

In Dr. Hudson's shooting experiments, Lightning powder in charges of 22 to 25 grains was found the best propellant for midrange loads in 30-caliber cartridges. Today the same powder is still one of the very best. No. 18 and HiVel perhaps may be used with equal satisfaction in some rifles and some cartridges. Unique and No. 80 are also good, but only in

the lighter charges. A great many shooters employ the regular or heavy weights of these bullets for their lightest loads.

For the benefit of those who have never inspected the factory cups, it can be said that they are made of sheet copper about .022-inch thick, or about 24 gauge. These sheets weigh about one pound per square foot, and can be bought measuring two feet by four, or larger. The factory cups in 30 caliber weigh upwards of five grians each. They are made very exact in size, and are nicely smoothed on edges.

Gas check bullet molds are cut to cast a shelf or half-groove right at the edge of the bullet's base. This is just deep enough to accept the cup snugly, and the latter is fitted on the bullet base by pressing or tapping it home. Usually a handloader starts the cups on the bases of his bullets lightly with his fingers, then seats them on firmly when he runs the bullets through the lubricating and sizing machine.

The Yankee cup forming tool consists of five parts. There is a main die, somewhat like a full length case resizing die except square. It is mortised out at the lower end to accept either of two smaller dies. Of these in 30-caliber, one has a hole through it about 13/32-inch in diameter, which is about the size of flat disc of copper required for a cup. The other has a hole measuring about .307, in which, by means of proper beveling and shouldering, the cup is formed. There are two punches which pass down through the main die, with ends to correspond to the small dies.

To make cups, the sheet copper is cut into strips a half inch or less in width, and from these are sheared the discs which then are formed. A light hammer supplies all the force required. One can make a hundred cups in a short time. The tool is entirely practical. Sheet copper of 27 gauge, about .015 thick, is just as good and easier worked than heavier stock.

One of the fields in which this tool does not compete with the factory-produced cup is in serving calibers larger than the 35s and 38-55. These are the largest for which any Ideal handbook has listed cups. There is a good deal of justification for cups on bullets of 40 and 45 calibers. A handloader with gas check bullets of the regular weights in such cartridges, can load full charges with assurance that there will be no fusion of the alloy, which fact he is not safe in assuming with plain-base bullets unless the smokeless powder charge is relatively light.

He can use, for instance, the powders normally in place when in full power loads in the big base cartridges, such as Lightning, Sharpshooter, No. 18, No. 16, HiVel, this getting away from the more hydroscopic No. 1 and Scheutzen, or from No. 80, which is inclined to set up too quick and heavy a pressure in the head of the case when in large full charges. These former powders burn too hot to trust them against unprotected lead alloy. No. 18 or Sharpshooter or Lightning are better in the bore.
in the 45-70 than No. 1, but only with jacketed or gas check bullets. The 35 and 405 Winchester cartridges are loaded excellently for midrange purposes with gas check bullets.

The cups in theory leave the bullets within a few feet from the muzzles of guns. Actually they do no such thing, but may be found most often out twenty to forty or a hundred yards, and sometimes they carry along with the bullet and leave it only after it strikes something. In theory, again, this irregular behavior should be a cause of serious inaccuracy, but we have some of our record groups to the credit of this type of bullets.

Probably the presence or absence of the cup on the bullet's base during flight through the air does not greatly effect matters. The point of more importance is that the cup is on the bullet while in the barrel, and while emerging from the muzzle, where square, true resistance to powder gases is essential to accuracy. The true form and edges of the cup cannot but improve accuracy at this point, especailly since the indentures of the rifling lands simply depress into and through the cup sides instead of making burrs extending rearward.

At 200 yards I have seen many a ten-shot group all well within the 8-inch bull, the loads being various, notably 16 of Lightning in the 22 H. P. Savage, 18 grains of No. 18 in the 250 Savage, 20 to 22 grains of either No. 18 or Lightning in the Krag, and 24 grains of Lightning or 28 grains of No. 18 in the 30-1906—the proper gas check bullet being used for each rifle. The normal group, however, is not greatly smaller than this, because there are few wild shots with bullets cast full and smooth and carefully resized.

The 500 and 600-yard accuracy is in proportion. Possibles are obtainable.

The power of the heavy gas check bullets can be discerned roughly in comparison with the velocities developed, and yet it can not be. As with other slugs of lead, distinct from jacketed missles at the same speed, these bullets make sorer wounds and have a good deal of a tendency to anchor game not too large. On woodchucks, for instance, the 200-grain 30-caliber bullet in Krag or Springfield will make clean kills while the service load and bullets lets most of them get into their holes. The gas check bullets should not be used on deer if regular full power ammunition can be obtained, but for turkeys, coyotes and all similar game it is excellent, as well as for squirrels and other very small game.

When used in Maxim silencers, these bullets have been objected to on the ground that the cups sometimes lodged within the instrument, to be struck by the next bullet with disastrous results. Such a thing might be possible, but it is not likely, and I have never seen it happen in the firing of some thousands of shots.

One probably is safe in stating explicitly that these gas check bullets used without the cups are not capable of as fine accuracy as plan, square-base bullets. They can be used without cups, however, and numbers of shooters have reported good accuracy. When they are cast full and round, the alloy hard, and the diameter well over that of the particular barrel in which they are fired, the indenture at the base edge has little or no effect. In larger barrels or when the bullets are slightly defective, it acts to prevent true upsettage and promotes gas cutting nad incorrect centering

The New Mark V Rifle

THE theory of placing the sights of military rifles as close to the eye as possible, thereby gaining the extreme in sight radius with a consequent increased accuracy has found favor with the British War Office and a new type of service weapon embodying this principle has just made its appearance. The large peep which is favored by many American shots has also been adopted in the sighting of this new weapon.

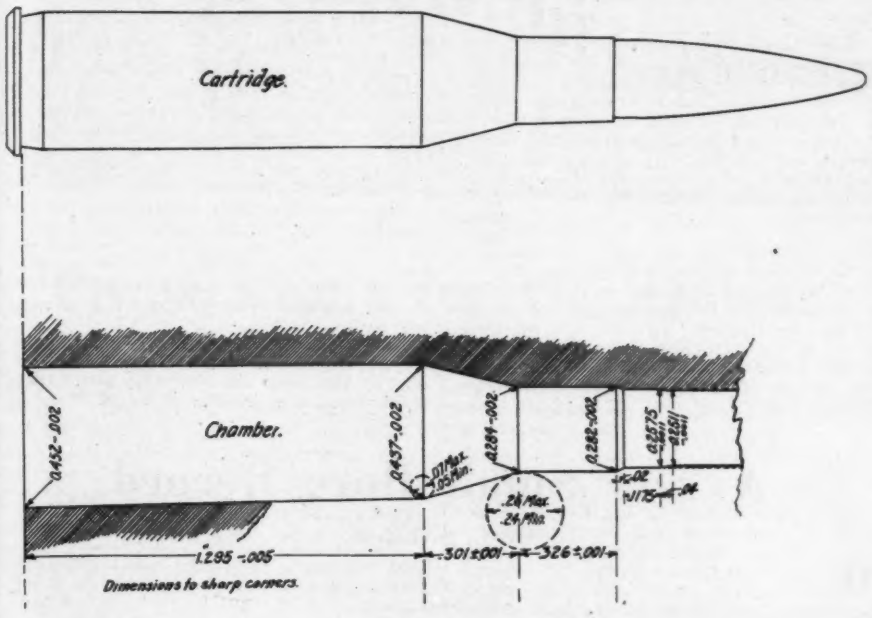
Just as most of the new departures in the design of United States service rifles appear first in public at the National Matches, so "The Mark V Short Rifle," as it is known, will be given its tryout at Bisley this year.

From the British *N. R. A. Shooting News* we learn that this rifle is the long expected new-comer with a peep sight. There are one or two small alterations from the Mark III weapon, but the chief feature of interest is the sight. This is situated on the action body, in the rear of the charger guide, which has been extended to form a bed for the sight. The sight is pivoted at the rear of this bed, so that it is brought as close up to the eye as possible. The peep is 0.1 inch diameter. This may be thought rather big by habitual users of the peep in Bisley conditions; but it is a very serviceable size, particularly in bad lights and at small or fleeting objects. The general arrangements of the sight are extremely ingenious, particularly the way in which it is held upright or at a forward angle of about forty-five degrees for setting by a steel spring-actuated ball in the sight base pressing in cups on the side of the leaf. The slide is so arranged that it presents two faces at right angles to one another, both faces being pierced with a peep. When folded flat down one face acts as a battle sight for 400 yards. With the leaf raised all ranges from 200 to 1,500 yards are available.

A number of samples of the new rifle will be on loan during the meeting for use in a competition for which good prizes are offered. Doubtless a large number of competitors will avail themselves of the opportunity of testing the new rifle and the competition should be a great success.

The Ballistic Primer

(*Continued from page 9*)



the Springfield, this being about 32.4. The coincidence may quite possibly be only a "happenso," but on the face of it, the appearances are at least a straw pointing the direction we must take.

Another, and perhaps better way still, to compare pitch is by the "angle of rifling" method, as follows:

Tangent $\Delta = \Pi$

Then for the .22 Hi-power tan.

$$\Delta = \frac{3.1416}{52.6} = .059726 \text{ and } \Delta = 3^\circ\ 25'$$

and for the .35 caliber tan.

$$\Delta = \frac{3.1416}{33.5} = .093779 \text{ and } \Delta = 5^\circ\ 21'$$

The length of the .22 caliber 70-grain bullet is just about 3.5 calibers. On this basis the rifling should be about n = 36, or one turn in 8.2 inches.

It so happens that those interested will find a tabulation of twists of rifling in rifle barrels as made by the various arms companies in the old "Ideal" handbook, page 75. For the benefit or riflemen who do not happen to have a copy of this book, the following extracts are made, the pitch in calibers being added.

Going back to consideration of the design which it is attempted to outline herein, the signs all point to the conclusion that a pitch or rifling should be chosen which will be between seven and eight inches. If Sir G. Greenhill's data is used, the bullet being 4.4 calibers long will require a pitch of about 28, or one turn in 7.2 inches; on the other hand, one of the most accurate rifles today is the 25-35, and this has a pitch of 8 inches.

As a boat tail bullet such as has been outlined may not be quite as stable as the flat base bullet of the 25-35, it way be well to cut in between these two and take a twist of one in 7½ inches.

Calibers.	Winchester		Remington		Marlin		Savage	
	Twist Inches	Twist Cal. Approx.	Inches Twist	Cal. Twist Approx.	Twist Inches	Twist Cal. Approx.	Twist Inches	Twist Cal. Approx.
22 Short	24	109	24	109				
22 Long Rifle..	16	73	16	73	16	73		
22 W. R. F.	14	64						
22 Hi-power ...							12	53
25-20 Repeater.	14	56	12	48	12	48		
25-35 & 25-36..	8	32	10	40	9	36	8	32
30-30	12	40	Auto 12	40	10	33	10	33
30 Springfield ..	10	33						
32-40.....	16	50			16	50	16	50
38-55.....	18	47			20	53	18	47
.405.....	14	35						
45-70.....	20	44			20	44		

To sum up what has been done in this study, we now have in a .25 caliber the following:

Cartridge case, semi rim,
Primer, F. A. No. 70, or equivalent,
Charge, 38 grains IMR 15½,
Estimated bullet weight, 110 grains,
Estimated muzzle velocity, 2700 f. s.,
Estimated breech pressure 46,000 pounds,"
Estimated remaining velocity at 1,000 yards, 1260 f. s.; all to be used in a suitable chamber as shown, with a barrel having a pitch of rifling of one turn in 7.5 inches.

So far in these studies, little or nothing has been said concerning the material with which we must work. Perhaps, at a later date, it may be possible to take up some of the questions relating to these and similar matters and to go more fully into some of the experience which was cited at the beginning as being a basis for the designs outlined.

HUNTING KNIVES AGAIN

By L. P. Holmes

WITH but few exceptions I have always accepted Major Whelen's statements and opinions as being just about correct, but in a recent issue of your magazine in his article on hunting knives, he comes out with a statement that irks a bit. He refers to the man carrying a sheath knife as being a tenderfoot. I don't like that and do not believe the Major exactly meant it in the light it would appear.

For years I have carried a sheath knife, Marble's Woodcraft to be exact, and have found it to be without exception the best all around knife on the market. Two of my hunting partners carry the same type of knife and by the wildest stretch of imagination no one could be justified in referring to these two hunters as tenderfeet. Personally, I have been sleeping at the campfire's side for a good many years, since I was twelve years old in fact, and feel I know the difference between necessary and valuable equipment and the other kind.

I have tried the heavy pocket knife and see it only as a disadvantage. Its weight in the pocket drags a good deal more than a Woodcraft slung well to the rear on a belt and it lacks the rigidity of Marble's admirable creation. I could ask for no better steel than is contained in my knife and have butchered and skinned a good many deer with only a single retouching with a stone between operations on separate animals.

In camp it slices bacon, cuts venison steaks, opens trout for cleaning, slices camp bread and in general conducts itself as a thoroughbred hunting knife should. It has never been too big to perform any of its duties efficiently nor yet too small as a pocket knife might be in certain emergencies.

Sometimes we are prone to tote along certain surplus articles in the way of equipment that are being tried out through more or less spirit of experimentation perhaps, but regardless of what else ever goes along on a hunting trip, you will always find two of tried and true dependence—my Springfield Sporter with its string of notches and my Marble's Woodcraft *sheath* knife.

A South African Shooting Match

NORTHWARD from Port Elizabeth, a forty miles or more along the old Grahamstown coach road, there lies a valley of some of the richest alluvial silt in the world.

The soil will grow anything if only it would rain, but day after day, week after week, month after month, goes by with never a cloud flecking the blue-green dome of sky above the sun-scored land.

Just at the entrance to the valley the road drops down a cutting through a steep bluff, crosses the dry bed of the river, climbs a stiff slope on the far side; and widens out into a dusty rutted square in front of the Drift Inn. A quaint old courtyard house, built of sun-dried bricks, pise, boulders from the river bed, with scarlet pantiled roof, and huge stables and outbuildings.

A notice, printed by hand, in bold rough lettering, tacked up on an old hitching post, announces that here will be held on the morrow, at two of the clock, a shooting match open to all-comers. For a week or more the news has spread from homestead to farm; from farm to store, carried by native boys, passed on from one to the other at drift, at forge or store, until everyone within sixty or a hundred miles has heard the news.

Already, though it still wants a full twenty-four hours to the time of the match, competitors are arriving, some bringing their entire families in trek wagons drawn by oxen, others in buckboards, Cape carts, or buggys; while others ride in on hardy little Basuto ponies. The range itself is but a few yards away, a level strip of ground some four hundred yards long by twenty yards wide, cleared of scrub, cactus, prickly pear and bush. The firing points at 200, 300 and 400 yards marked by hardwood pegs, driven into the sun-baked soil, and the butts are backed by a two-hundred-foot scarp of cliff on the far side of the dried-up river bed, where, on a narrow ledge, are fixed rough target frames with the usual black bulls.

Back at the Drift Inn all is bustle and noise, and the outspan is by now cluttered and filled with the wagons and tents of those who have come from far to take part in the match. There is greeting of old friends and the meetings of new ones, talking, smoking, drinking, arguing over shoots, and watching the newcomers arrive.

The time passes pleasantly until supper is served in the guest room of the Inn, and then after a final pipe or two everybody wanders away to their shake down for the night.

Comes the morning and all are afoot early, for the preliminaries of the matches take time; and there is much discussion and dispute until everything is settled.

Ten people have put up as prizes ten articles, useful or otherwise, for which they have no personal need, at various entrance fees in accordance with the value of the prize. Let me explain, One Jan Villiers, a Dutchman, has a Cape cart in good condition and quite serviceable, for which he has no immediate use, and so he enters it as a prize and asks for fifty competitors at an entrance fee of ten shillings each, five shots at three hundred yards.

The host of the Drift Inn has entered a case of whiskey for which he requires forty competitors at an entrance fee of five shillings each, three shots at four hundred yards.

Some one else has put up a pony at thirty competitors at ten shillings each, seven shots at two hundred yards. Others have entered various things, such as a saddle and bridle, set of harness, a twelve-bore gun, a churn, a plough, a watch, and a pair of breeding ostriches; all with their respective entrance fees and conditions as to number of shots and range.

Now the condition and value of the prizes has been carefully assessed by those who have come to shoot, and while the Cape cart, case of whiskey, and twelve-bore gun have easily got a full list each, the other prizes are less popular and the saddle and bridle, churn, plough and breeding ostriches are withdrawn and the pony, set of harness, and watch gradually reach the required number of competitors.

The conditions of the shoots are simple, a certain number of shots varying from three to seven at ranges from two to four hundred yards as named by the men putting up the prizes. No sighters. Ties are shot off three shots at unknown range. Any rifles may be used and these upon inspection are very mixed and various. Martini's, rifle and carbine, Enfield's, Mausers, sporting rifles of all kinds, sizes, bores, ages and descriptions. A regular museum of firearms.

But when they get down to work on the range it does not seem to make much difference, for most of the men are shots above the average and know their rifles, and things run smoothly and well through the various competitions.

Ladies rarely shoot but they can nominate a man to fire on their behalf, and the known good shots are in keen demand; and as one of the prizes is usually set apart for ladies there is no difficulty on account of a man undershooting when he is representing someone else.

And so the shoot goes on until all the prizes have been won, and then at the finish Robertson finds that he has won a pony he does not want, and Drinkwater the whiskey he does not use. But even so they promptly hold an auction and the unwanted prize is converted into hard cash.

And after it is over and done with, the oxen are inspanned and horses harnessed or saddled up and under the stars they start off on the homeward trek.—*The Rifleman.*

A New Small Bore Record

By C. S. Landis

ON May 19, Edgar F. Burkins of Wilmington, Delaware, who won the outdoor, home-range, small-bore championship of Continental United States last year, scored 57 consecutive bulls-eyes on a C5 record target at 200 yards. Burkins was shooting in a regularly advertised unlimited re-entry match of the Wilmington Rifle Club, and was shooting shoulder to shoulder with a number of competitors.

Unusually calm weather and an even light resulted in several exceptional scores on the Wilmington range on this date. Burkins had two C5 targets on the frame at 200 yards. He began by scoring 18 consecutive 5's on the upper or sighting target. He then scored a 4 but kept on shooting, making another long run of 33 consecutive 5's on the same target before getting another 4. This gave him 51 fives and 2 fours on his sighting target.

After resting a few moments he began firing on the lower target while the writer and E. W. Pierson began shooting record targets about thirty feet away on the 50-yard range. W. O. Webster and F. R. Lesney, two of the club's best small-bore shots, who had finished shooting for the day, were standing back of the firing line watching the shooting, and D. Copeland and two other men were shooting on the 20-yard revolver range to the right of the rifle ranges.

Burkins shot 35 consecutive 5's on his lower or record target and then stopped to rest as Landis completed two consecutive 10-shot possibles at 50 yards, then being out of targets with small bulls-eyes, Landis started shooting again on his 50-yard sighting-in target, finishing with a long run of 22 tens.

As consecutive long runs of 33 and 35 5's are a bit unusual, Burkins and myself then walked up to the 200-yard butt and examined Burkins' targets, returned to the firing line and again began shooting for record. Burkins on his lower target, I on N. R. A. targets with 3" black. We neither fired any sighting shots. Burkins shot rather slowly as he had cut off half the middle finger on his left hand a week before and the hand was beginning to pain him. He stopped firing for a few moments each time after scoring 40, 45, and 50 bulls. I meanwhile scored two additional and consecutive 10-shot possibles at 50 yards, giving him four in a row, and Burkins five.

At this stage—7 P.M.—the light became very poor and both men began to complain of this feature.

Burkins almost lost his fifty-fifth shot on a fadeout, but it cut the edge at 3 o'clock (54 consecutive shots had struck entirely inside the 5 ring). I lost my forty-seventh shot at 9, at 2 o'clock, also on a fadeout and finished with a 99 for a score of 499 x 500, after which I made 6 more 10's on a sixth target, while Burkins kept going for three shots more, losing his fifty-eighth record shot on a fadeout, getting a 4, also out at 2 o'clock.

This gave Burkins absolutely consecutive long runs of 18, 33, and 57—5's or 108 bulls out of 110 consecutive shots in competition on a measure outdoor range of 200 yards. The 57—5's are a new world's record long-run, so far as is known.

Fifty-five of the fifty-seven 5's on Burkins' target were in a rectangle 5 inches high by 4½ inches wide. He also scored 19 consecutive 10's at 100 yards in making a 99 and a possible before beginning to shoot at 200 yards.

Burkins used a Model 52 Winchester rifle, very finely restocked by himself, a 5A scope and Precision 200 ammunition. The writer used the same type of outfit except that his rifle was not restocked, being a new rifle just being tried out.

A Correction

Editor American Rifleman:

Kindly make correction in your columns of an error of memory contained in the story on a Palma match for 1923 in which I mention Captain Alderman as the coach of the Argentino team in that match.

It should have been Major W. H. Hyde, a member of the 1912 team which went to the Argentine Republic, and who was asked by the Argentinos to coach their team in the 1913 match. Captain Alderman was the assistant selected by Major Hyde.

CAPTAIN EDWARD C. CROSSMAN.
Takilma, Oregon, June 29.

Preparations for the Dewar

By Col. C. E. Stodter

WE won the Dewar Match last year with the small margin of 40 points, an average of only two points per man. We must do better this year if we are to keep the trophy. Our average per man was 384.25. We should make an average of not less than 387 this year. To do this we must first of all have a large number of the best small bore shooters of the country from which to pick a team. The team will be selected by a preliminary tryout and every good small bore shooter should make a special effort to attend the tryout. A lot of old timers were crowded off the team last year by new men and the same will happen this year.

In order to make a place on the team the competitor must not only be able to hold, but his equipment must be right. The rifle should be one in which the user has perfect confidence, and having obtained such a rifle the shooter should, by careful test, determine which ammunition gives the best results, and take a sufficient quantity of this ammunition with him to Camp Perry. There is sometimes a considerable difference in different lots from the same loading company and the lot that has been selected may not be available at Perry.

If an aperture front sight is used it should be at least twice the apparent diameter of the bulls-eye. Three times is not too large. Most of the apertures used are too small. The aperture should be from .07" to 10", depending on the distance between sights. If a blade or post is used it should be wide enough to cover the bull and should have clean cut sharp edges. The rear aperture should be rather large and clean cut. Nothing is gained by the use of very small rear apertures. The rear sight must be capable of adjustment to half minute both for elevation and for windage, and the adjustments should be positive without back lash or lost motion. There should be absolutely no looseness in the joints.

The forward sling swivel should be placed at the proper distance from the butt plate. If too far the hand does not get proper support from the sling and if too close the position is cramped. The sling should be of material that will not slip or stretch.

The trigger should have a clean snappy pull, and the hammer should have a short fall.

The rifle should be equipped with a well fitting stock. Riflemen lose many points by trying to adapt themselves to badly designed stocks. Most commercial stocks have too much drop both at heel and comb and are frequently too short from trigger to butt plate. A stock for use in the prone position should be very straight in order to bring the butt plate well up on the shoulder. The butt plate should be so made that it will not slip on the shoulder and the stock must be securely fastened to the rifle.

Steady holding depends principally on the correctness of the position. The rifleman should experiment by making slight changes in the position of the elbows, the angle of the body to the firing line, the tension on the sling, position of the butt on the shoulder and other details of the position until he is satisfied that he is securing the best results and then carefully note all the details of the position and stick to it.

This Medal (obverse, right; reverse, left) is given to every member of the winning team. Small bore riflemen will have their work cut out to keep them here this year.

This practice can best be done without firing, but by snapping on empty cartridge cases. Ten minutes a day of careful snapping practice is worth more than several hours of firing only once a week.

The rifleman should go to Camp Perry with his rifle carefully sighted in and complete and accurate details of his sight adjustments and wind and weather conditions recorded in his score book.

The shooting coat should have the elbows well padded and a button or hook on the sleeve to keep the sling from slipping down. Sore elbows cause the loss of many points.

The spotting telescope should give clear definition as it is frequently difficult to see bullet holes at 100 yards.

High power is not so essential as clearness and brilliancy. When there is a heavy mirage, or the light is bad, a glass of medium power will give better results than one of high power.

While experienced riflemen are familiar with all these details, they do not always give sufficient attention to them. This was demonstrated at Camp Perry last year.

The difference between a good rifleman and an excellent one is generally due to the careful attention given by the latter to all the little details connected with shooting.

THE reduction in price of the Russian rifles to $3.34 including packing charges and of the ammunition to $4.00 per thousand gives members of the N. R. A. an opportunity to secure a good serviceable high power rifle and ammunition at a remarkably low price. A description of this rifle with illustrations was published in Arms and the Man for November 15, 1921. While this rifle is not much for looks in its original condition, it is capable of being converted into an attractive and efficient hunting rifle.

The cartridge has a rather short thick rimmed case loaded with 46.5 grains of what looks like Dupont No. 20. The bullet weighs 147 grains and looks very much like our 150 grain service bullet except it has a hollow in the base.

The muzzle velocity is 2900 f. s. The cases can be reloaded with the .30 caliber bullets used in the model 1906 cartridge. The ammunition for these rifles is all at Benicia Arsenal, California, and most of the rifles are there, but there are a few at eastern and central arsenals.

The Lyman Gun Sight Corporation, Middlefield, Conn., is prepared to supply their No. 50 receiver sight for the Ross rifle, cal. .303 Mark II, for $11.00. Tap and drill 50 cents extra. This is a very well made sight with elevation adjustment by rack and pinion and windage by thumb screw.

THIS office receives occasional requests for the model 1922 short pistol grip stock to fit the model 1903, .30 caliber rifle either with or without the rear sight base removed. None of these stocks are available, because the 30 caliber barrel being ordinarily covered by the hand guard is rather roughly finished and is not held to exact outside dimensions. The regular service stock is cut out much larger than the barrel and does not touch the barrel except at the receiver and the upper band. This space is covered by the hand guard. The long pistol grip stocks are made in the same way.

Purchasers of the service rifle frequently have the rear sight base removed and the barrel turned down slightly, and of course it is impossible to make stocks which will fit in all these special cases.

Stocks can be made by hand at Springfield Armory to fit any rifle but the price will be rather high and no fixed price can be set for such work.

There is no machinery now available for cutting these stocks to fit the Krag rifle or carbine.

Rough turned stocks without cuts for barrel receiver and magazine can be purchased for $5.84, which includes packing charges.

REQUESTS have been received for Krag rifles or carbines with barrels of 24 or 26 inches. No difficulty is encountered in cutting off the barrel to any length desired, but the trouble arises in fitting a front sight.

The carbines now on hand were made by cutting down Krag rifle to 22 inches and fitting them with the Springfield front sight. If the barrel is cut longer than 22 inches, the Springfield fixed stud does not fit and a special stud would have to be made which would increase the cost by about $10.00.

IN firing Course A or Course B for qualification the service rifle must be used "as issued," consequently the pistol grip stock, Marine Corps sights, Lyman sights or any other devices or attachments not used on the rifle as furnished to troops are not permitted.

"The Dope Bag"

A free service to target, big game and field shots, all questions being answered directly by mail.

Rifles and big game hunting: Maj. Townsend Whelen.

Pistols and Revolvers: Maj. J. S. Hatcher.

Shotguns and Field Shooting: Capt. Charles Askins.

Every care is used in collecting data for questions submitted, but no responsibility is assumed for any accidents which may occur.

The Virgin Jungle

By Townsend Whelen

TO the American rifleman the lure of the far north woods comes naturally; but when moose, deer and bear have fallen to the hunter's bullets, the compass needle of his desires swings southward and he sees in his fireside dreamings the dappled coat of a jaguar through a screen of tropic trees.

From such a one—Monroe Steiner of Brooklyn—has come a letter. He says:

"I want particularly to get a jaguar, and have in mind a trip to either the Canal Zone, the northern coast of South America, or any comparatively accessible place that could be recommended.

"My arsenal consists of Sporting Springfield, 33 Winchester, 22 Remington, 12 gauge Remington pump gun, 16 gauge Parker, and 45 Colt automatic pistol. Which of these (if any) would you take along? (A real good excuse to buy a new gun would be welcome). Also, what is your advice as to clothing—especially footwear?"

Now the only portion of the Central American tropics in which I have hunted is Panama; but I did spend three years exploring in that country, so know it well.

Panama is roughly 400 miles long, 48 miles wide at its narrowest part, (the Canal Zone) and 125 miles wide at its widest part. A strip five miles on either side of the Canal is included in the Canal Zone under the United States. The rest is in the Republic of Panama. There is not the slightest restriction on an American wandering at will anywhere in the Republic. A smattering of Spanish is desirable. The rainy season is May to December, the hot season April to September, the best months January and February. In the sun from May to July it is very hot, but otherwise the climate is better than in New York in summer. In the shade of the jungle it is always balmy. They never have an oppressive night. The Washington Hotel at Colon, and the Tivoli Hotel at Panama are first class, $5.00 per day American plan in 1917.

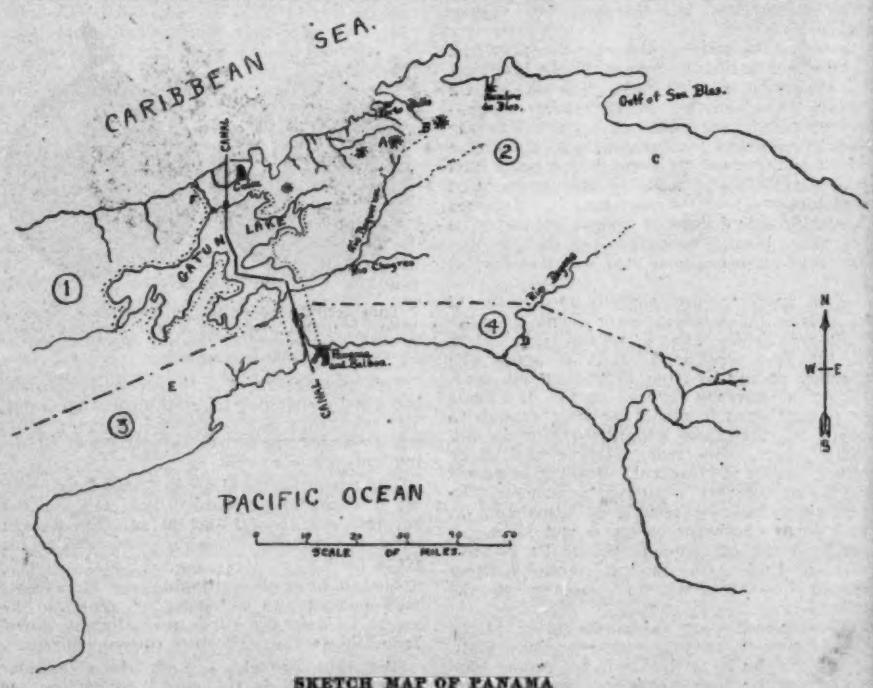
To the sportsman who wishes to visit the big ditch, I can say, open your atlas at Panama. The coasts are accurately charted. The ten principal towns are there all right. The country adjacent to the Pacific Coast, (say within 10 miles of it) contains much open country, small villages, ranches, farms, and cattle. It's a good deer country, and hounds can be used in it. Sometimes the deer hunters in this section get jaguar and puma, also peccary. The interior of Panama outside of this stretch is mountain country, thickly covered with a beautiful forest jungle, absolutely uninhabited and unexplored. We will hereafter call this the "Virgin Jungle." Along the coast there are many little villages. A typical Panamanian village has a church, a priest, an alcalde (mayor), a Chinese storekeeper, a cock pit, about a dozen rum shops. The inhabitants are a very poor class of negro breeds speaking Spanish. On Sundays and feast days everyone in town will be drunk. As a rule you will find no one who knows anything about the country except the way to the next town, and no one who is capable of rendering you any assistance whatever in anything. The towns are therefore merely a source of supply for common groceries, fruit, and fish.

Health: Panama is a very healthy country for vigorous men who keep in the open. The health of our troops there is better than in the United States. The thing to look out for is malaria. Malaria comes only from a malaria mosquito biting a person with malaria in his blood and then infecting a well person. Malaria mosquitoes fly only at night and never go more than a mile from where they have been born. All natives are infected with malaria. Malarial mosquitoes are everywhere under 2,000 feet altitude but only those within a mile of human habitation are infected. There is no danger in the cities of Colon or Panama. It therefore follows that if one keeps at least a mile from any human habitation after nightfall there is no danger of malaria. The virgin jungle is absoluetly safe from malaria. In the last 20 years there has been but one case of snake bite treated in the hospitals of the Canal Zone.

Pests: There are many ants, red bugs, ticks, etc., but they are not particularly bothersome from October to March. In the jungle below time, but at night they are thick and a mosquito proof tent is absolutely essential. A closed tent is impossible on account of the heat. What you want is a very small wall tent with Green Waterproof Egyptian Roof, and Green Waterproof Egyptian Floor, with sides and ends of mosquito netting of mesh as fine as cheese cloth. You pitch tent over a mattress of palm leaves. One side of mosquito netting is loose at bottom. Pull up, enter, and tuck mosquito netting under floor. I never felt the need of a mattress or blanket but carried an ordinary cotton sheet, took off my clothes, laid down on floor of tent, pulled sheet over me, and slept well all night. Tent weighed 4½ pounds. See Von Lengerke and Detmold in New York. Tell them Dave Abercrombie made it for me in 1915 or 1916. Size 4 feet wide by 7 feet long. In the jungle there is little wind and rain always comes straight down. So roof overhung walls by six inches on all sides and gave full protection. This is important because out in the bush to be comfortable and healthy you must live in your own camp at least a mile from any habitation.

There are no guides in Panama. Natives are worse than useless, and it is absolutely dangerous to take them with one as they will probably infect the mosquitoes. But I think the hunter can easily find some old time American who knows the way of the bush and who speaks Spanish who will be only too glad to go with you. There is a rifle club in Panama. The members are all hunters, and collectively they know more of the country and the game than anyone else. They are all fine fellows and will be glad to put you wise and help you after you arrive. One of these, Otto Lindo, Panama City, can be particularly useful.

Panama is not a big game hunting country. A man going there for hunting alone will be disappointed. I think this pertains also to all of Central and South America. But it is the most interesting country I have ever been in, and I would rather go back there than any place that I know of. Panama is rather a naturalists' country. The virgin jungle is absolutely wonderful. It is a mountain country covered with thick forests, even on the tops of the mountains. The



SKETCH MAP OF PANAMA

Dotted line on either side of the Canal shows the Canal Zone under United States jurisdiction. Remainder of the country is in the Republic of Panama.

Dotted and dashed line, and the Canal divides the country into four areas, as follows:

Northwest Area (1) is slightly mountainous and partly known. Fairly good hunting.

Northeast Area (2) is the unknown. Virgin jungle wilderness, and extremely mountainous. No trails, and no guides. Best and most interesting hunting country. Deer scarce.

Southwest Area(3) and Southeast Area (4) is plains country adjacent to Pacific Coast. Well known, many small towns and ranches. Plains and second growth jungle. Many deer. Crocodiles in all rivers.

Excellent fishing on both coasts. Tuna found only on Pacific side, and Tarpon on Caribbean. Excellent tarpon and other fishing in lower Chagres River at F.

A is Cerro Bruja, 3100 feet, first ascended by writer in 1917.

B is Cerro Saximo, between 4000 and 6000 feet, never ascended.

C is the San Blas country, said to be dangerous for anyone to penetrate on account of hostility of Indians.

D is Rio Bayano, a celebrated hunting region. Enormous crocodiles in lower river.

E is an excellent locality for deer hunting with hounds.

wonderful trees go up 100 feet without a limb, and then spread out their verdure to hide the sky. Under them everything is shade and cool, and nothing grows but ferns and palms. It is as easy walking through this jungle as through the woods at home. The country is well watered but a canteen is esential as you travel mostly on the ridges and don't want to climb down a couple of hundred feet whenever you want a drink, which is usually about every half hour. I was always able to make my camp alongside a stream of fine water big enough to take a swim in.

The virgin jungle contains thousands of birds of all descriptions, brilliant plumage, most of them edible, including species of wild turkey, grouse, quail, and doves. The doves are plentiful, and particularly fine eating. Animals are peccary, tapir, puma, jaguar, paca, ant eaters, coati mundi, agouti, monkeys, sloth, kinkajou, squirrels, opossum, and rabbits. Reptiles are crocodiles, lizard, and snakes. Not many of the latter, some big boas; I saw about five poisonous snakes in three years.

The partly wooded and plain country, beside the birds, contains deer, peccary, puma, and jaguar.

In the jungle you meet big game only by accident. Practically all my work was done in the virgin jungle, and in three years I never saw a cat. One of my engineer soldiers one day shot a fine jaguar from a hand car on the railroad with his .45 Automatic Pistol. A college professor out after butterflies, saw what he thought was a couple in the grass in a drainage ditch in the Canal Zone, and he brought his net down over the head of a fine jaguar. There is much better chance for jaguar in the open country, running them with hounds, but I do not think that with two months in Panama the chance for jaguar is very good; but the chance for a very interesting time is immense.

Panama (both coasts) is a big game fisherman's paradise.

Outfit for hunting—6 months' supply.

Lots of cotton underwear and light wool socks.
4 Khaki breeches.
4 Olive drab flannel shirts.
2 Canvas Leggins.
4 Heavy hob nailed Munson Army Shoes.
1 Campaign Hat.
Canteen.
Machete (cut down to 15 inch blade with holster)
Compass (good and waterproof)
Waterproof match box, with supply of matches from home.
Tent, sheet, and pillow case, as described above.
Light aluminum cooking kit.
Waterproof grub sacks.
Duiuth packsack to carry outfit in.
Medicine kit (mainly quinine, iodine, and hypo syringe with permanganate and strychine for snake bites.)
Fishing tackle.
Springfield Rifle. (Best because of fine small game loads for it, and because it can be taken apart without tools. Rifle will get saturated with perspiration every day.)
Cheap 20 gauge shotgun.
Plenty of reduced load ammunition and shotgun shells.

Your plan of campaign that I would suggest would be to ascend one of the rivers into the virgin jungle for a month, taking everything in pack sacks; then another month in the open country, perhaps around David, with hounds after deer, peccary, and cats.

A SPECIAL SPRINGFIELD

YOU HAVE HELPED me in many things in the past. Once again I am writing to you for your opinion of an idea of mine. For sometime—and now I am about to do it—I have been wanting to go through with a pet scheme of mine, so here it is, and I want your opinion of it, and I want your opinions of it first.

I am thinking of taking the Springfield Rifle Model 1903, one of the best of them as issued, regulation, taking the barrel from it, and sending it to a first-class gunsmith, and having him to make and attach for me complete, a barrel either 28 or 30 inches in length, and in diameter to measure one inch at the breech, tapering down evenly to ¾-inch at the muzzle, of course, finished, bored and rifled by him to the very best of measurements, to handle both the 160-grain and the 141 or 145-grain bullet, which ever it was, or could you suggest 160-grain bullet, to get 300-ft. muzzle velocity? This is what I want, now I wish that you would be kind enough to give me your opinion, both good and bad.

To my way of thinking, this has struck me as making one of the finest, and most ideal, big game rifles, and as for a real target rifle, for mixed matches, properly sighted, and stocked, which I would have done, I have an idea, that it would be a hard bird to beat, handled by the right man.

In your opinion, how do you think, it will compare in a match competition, along side of the 1922-Springfield, 30-caliber, heavy pressure barrel International Match Rifle? This does not mean having a specially close chamber; it is to handle the standard Ross or Western 180-caliber cartridge.

W. L. T., Trenton, N. J.

Answer (by Maj. Whelen). A good gunsmith can undoubtedly make you a barrel such as you wish. Instead of the dimensions you suggest, I would advise a barrel as follows: Starting at the breech, a cylindrical portion 1.25-inch in diameter and 1.50-inch long. Then a straight taper 2.00-inch long to a diameter of .95-inch at the forward end of this taper (3.50-inch from the receiver). Then a straight taper from this point to a diameter of about .70-inch at the muzzle. Such a barrel will be stiffer than the one you suggest, will not weigh any more, and should vibrate more evenly than the one with light breech and with straight taper from breech to muzzle.

Generally speaking, a 30-inch barrel will give you 150 f. s. more velocity than a 24-inch barrel. Ammunition that gives M. V. 2700 f. s. in a 24-inch barrel should give about M. V. 2850 f. s. in a 30-inch barrel.

Every bullet seems to have a M. V. at which it does its best work. For the 150-grain bullet this seems to be about 2800 f. s. There is a little evidence that seems to indicate that a 150-grain bullet at M. V. 3000 f. s. is not quite as accurate as the same bullet at M. V. 2800 f. s.

I do not know of any 160-grain bullets on the market. The United States Cartridge Company make a 145-grain bullet with copper tube point. The construction of, and the care taken in making the bullets has a lot to do with accuracy. Today the only 150-grain bullets you can obtain are thost made in very large quantities, and with no particular pains taken their fabrication. On the other hand, you can now obtain 170 and 180-grain bullets made with the greatest care for extremely accurate work. I would advise the heavier bullet, but personally I am at a loss whether to advise you to use 170 or 180-grain bullets. The boat-tail bullet has proved more accurate than the flat base bullet. But when you try to drive the boat-tail bullet at very high velocities the accuracy seems to fall off a little, probably due to the increased breech preasure introducing a little gas cutting. The base of the boat-tail bullet is such that it rather favors gas cutting by forming a funnel which leads the gas in between bullet and bore. In my opinion the 170 and 180-grain boat-tail bullets are most efficient at those preasures which give M. V. 2700 f. s. in a 24-inch barrel (or M. V. 2850 f. s. in a 30-inch barrel).

A short, very heavy barrel (24-inch International barrel) is very efficient. There is very little vibration to such a barrel. It will undoubtedly shoot poor ammunition better than a longer barrel because the variation in loading of poor ammunition sets up uneven vibrations, and these uneven vibrations effect a short, stiff barrel less than a longer one. But the longer barrel has decided advantages with first-class ammunition, giving higher velocity and a longer sight radius.

If a long barrel be chosen, then most decidedly you should use bullets jacketed with gliding metal or Lubaloy. A long barrel picks up more metal fouling near the muzzle than does a short barrel, and I feel sure that in a long barrel metal fouling will affect the accuracy adversely if bullets with cupro nickel jackets be used.

Now we come to chambers. You want a close chamber, but one that will handle any first-class machine loaded ammunition. This is right. You cannot possibly get any more accurate ammunition than the Frankford Arsenal National Match Ammunition, or the Palma and International Ammunition. Your chamber should certainly be cut to allow you to use such ammunition. Please remember that the entire fabrication of the ammunition is most important. The finest rifle will not shoot well with poor cartridges. No matter how fine a barrel one has, nor how skilled he is in loading ammunition, he cannot get the results with any 150-grain bullet now procurable that he can with the latest National Match and Palma ammunition.

In figuring on such a barrel you again have to revert to the ammunition. If you wish the very best results at 1,000 yards you must use National Match or Palma ammunition, and such ammunition contains Hi Vel powder. It erodes rather quickly, and if you do much shooting you will probably shoot about 2,000 rounds in a season, and at the end of this time your barrel will be pretty well worn out. If you do not care for extreme accuracy beyond 600 yards, then at that range you can get just as good accuracy from the proper progressive burning powder and National Match or Palma components. Such a load will have to be assembled by hand. It will probably give fine accuracy for at least 3,000 rounds. In figuring barrel life it is always well to remember that a new match barrel costs about the same as 1,000 rounds of ammunition.

In reading between the lines above you will see that I have advised you to obtain a moderately heavy 30-inch barrel of special dimensions chambered tight for the standard ammunition. In it I would use National Match or Palma ammunition with gilding metal or Lubaloy, 170 or 180 grain bullets. This ammunition will give you about 2850 f. s. muzzle velocity. For 600 yards or under I would use the 170 grain National Match gilding metal jacketed boat-tail bullet, or the 180 grain Lubaloy full jacketed Palma boat-tail bullet with a powder charge in either case of 46 grains of du Pont I. M.R. Powder No. 16. The muzzle velocity of these loads in your 30-inch barrel will be about 2800 f. f.

Recently I had Mr. Howe make me up a rifle with a barrel very closely approximating the dimensions recommended at the beginning of this letter. The length of the barrel is 28 inches. I have not had much chance to try it as yet. In fact I have only had it on the range one afternoon, and have only shot it at the rather short range of 100 yards to establish the zero of the sights. After establishing the zero of the sights I fired one group of ten shots at this 100 yard range. The load was 46 grains of du Pont No. 16 powder and the 170 grain Frankford Arsenal gilding metal jacketed boat-tail bullet (1922 National Match bullet). The entire ten shots cut into one hole, and make it difficult to measure the group. As nearly as can be determined the group measure is about .80 inch. This is the finest group I have ever obtained at 100 yards.

HOW TO USE THE DOPE BAG

Address the Director of Civilian Marksmanship, and not the Dope Bag on Arms and Ammunition available for sale and prices on same.

Mark your letters at the head for the proper man, and deal only with one subject, i. e., rifles or pistols or shotguns in one letter. It is impracticable to refer letters around.

Write legibly on one side of paper only and sign name and address legibly. Almost every mail contains letters that cannot be deciphered and hence cannot be answered.

Before writing consult the various catalogues and ballistic tables published by manufacturers. Much information can be obtained from them as well as from standard books and publications of the N. R. A.

WARTIME KRAG AMMUNITION

WILL you kindly advise me what kind of powder is used in the Remington Krag ammunition marked R. A. "17"? I should like to draw the metal cased bullets and replace them with 220 gr. W. C. Co. Lubalioy soft point bullets and should like to reload, if this can safely be done, with the same powder to obtain a muzzle velocity of 2200 foot. What weight of the above powder will give approximately 2200 foot seconds and about what would the pressure be? The above cases are weak near the head as about 50 per cent. blow off at this point when they are fired and reloaded with 41.5 grs. duPont No. 16 powder and the Rem. 180 gr. spitzer bullet. So in drawing the bullets and reloading the unfired cases I think the pressure should be not greater than 41000 lbs. to prevent the tearing off of case heads.

Is it absolutely safe to use 43 grs. No. 16 powder and the 180 gr. W. C. Co. open boat-tail bullet in a 1919 Match Springfield Sporting rifle Several riflemen including my old friend Crossman think that the pressures developed in this load are dangerous, In reloading dense powders I weigh my powder with Assay Balances to one tenth of a grain but I do not want to run any chances in the selection of my powder charges. Trusting that you will give me the above information and thanking you in advance, I am.

H. N. S., Rawlins, Wyoming.

Answer (by Maj. Whtien):

In contracting for ammunition loaded during the war for the Krag rifle the Government went right back to the specifications of this ammunition for about 1905 and specified that it be loaded with W-A powder, an old nitro glycerine powder, made in 1917 by the Hercules Powder Company. Approximately 34.5 grains of this powder was used, giving a muzzle velocity of 2000 f. s. with a breech pressure of about 38,000 lbs. per square inch. The maximum allowable mean pressure in the Krag is 42,000 lbs. Please note that the powder charge in these cartridges may vary a little according to the ballistics of the particular lot of W-A powder used.

Back in the days of the Krag rifle, when we

were using it for fine target shooting we found that the most accurate charge of W-A powder for use with the 220 grain bullet was 36.2 grains. That is the charge would be 36.2 grains if the particular lot of powder gave the standard velocity and pressure (2000 f. s. and 38,000 lbs.) with 34.5 grains. If the particular lot of powder used happened to be quicker this 36.2 charge would be reduced accordingly. This charge of 36.2 grains gave a M. V. of about 2100 f. s. and a pressure of about 41,000 lbs., and was considered the maximum charge with the Krag.

Your 17 Krag ammunition is most decidedly of war manufacture. The brass in the cases is nothing to brag about, and little attention has been given to getting the anneal exactly right. I must caution you against reloading these cases with maximum charges, or with any charges heavier than the normal charge. In fact, I think you will have trouble with them with any charge. Probably there will be a large proportion of split necks. This applies to all Krag ammunition loaded during the war, and is not confined to that of Remington make. It also applies to .30-06 ammunition of war manufacture, and particularly to this latter caliber because so much of it was made up for use in machine guns. Machine gun cartridge cases have a softer anneal than those intended for use in rifles, and are decidedly not satisfactory for use with maximum charges in rifles. There is no way for the rifleman to tell cases made for machine guns and rifles from each other in the lots manufactured before 1921.

You can salvage the W-A powder from your R. A. 17 Krag ammunition and use it with a slightly increased load. Carefully weigh ten of the charges as you take them from the old cases, and strike an average. Suppose the average proves to be 35 grains. You can then use an increased charge of 1.5 grains over this in your new loads, or 37 grains. This for 220-grain bullets. This increased charge will give you about M. V. 2100 f. s. and a pressure of about 41,000 lbs. It is the maximum charge of W-A powder that should be used in the Krag rifle or carbine with 220-grain bullet. With 220 grain Lubaloy bullets this charge should give fine results and excellent accuracy. Be sure to use only new cartridge cases (those made since 1920 and in good condition) and do not trust war time cases, as cautioned above. There are many reasons, too numerous to enumerate here, why war time cases should not be used. Riflemen would do well to scrap all war time cases.

Turning now to the Springfield rifle. The load of 48 grains of Du Pont No. 16 powder and 180-grain open point boat-tail bullet is a stiff maximum charge. Du Pont reports an M. V. of 2661 f. s. with a mean pressure of 50,030 lbs. I am inclined to think that the average mean pressure will usually be higher than this. Like all maximum charges, certain precautions must be taken with it. The powder charge must be carefully weighed, only newly-made cases intended for use in rifles should be used (no war time cases), only brass primers (like the F. A. No. 70) should be used, and it should be used only in barrels having the normal service (Springfield) chamber (no tight chambered Pope or Niedner barrels should be used). If these precautions be observed I regard the load as safe.

As to maximum loads, I should like to remark that I am to a certain extent forced to give the data on them by public opinion and by the constant demand for more power. I do not like them. I never fire thtm except experimentally. In my own rifles I never use them. Fifty feet per second in velocity is not appreciable at tht target or at game, and by reducing the velocity that much you get a load giving about 2,000 lbs. less pressure, and one that is thoroughly safe and reliable.

If you wish a maximum load for the 180-grain Lubaloy open point boat-tail bullet I would strongly advise that you use 53.0 grains of Du Pont I. M. R. No. 15 Trade Lot No. 2, instead of No. 16 powder. This load gives M. V. 2725 f. s. (64 feet more than No. 16) and is better and safer in every way. Like all other maximum loads, the precautions detailed above should be observed in loading it.

Reverting again to the Krag rifle, I note that you want a load to get 2200 f. s. with the 220 grain Lubaloy bullet. In my opinion you should not try to get it with the old W-A powder. With that powder the pressure will be too high and the erosion excessive. I would advise as a maximum load 38.5 grains of du Pont No. 16 powder. This should give just about 2200 f. s. with a pressure of about 41,000 lbs., and the erosion should be very moderate.

I think it would be a good idea if you gave this letter all the publicity possible. Too many riflemen are working with maximum loads without the knowledge nectssary to the safe handling of such loads.

THE LIGHT LEE-ENFIELD

I HAVE a Lee-Enfield carbine beautifully made into a sporter model, as used by British Cavalry in Boer war 1900. Its weight is six and a half pounds. Is this too light for accurate shooting? Using a 150 grain Spitzer bullet, vel. 2750, yet the recoil is not bad. I use Moddite powder in this shell—what is Moddite powder? Is it hard on the barrel, like Cordite powder? What weight powder of du Pont No. 16 do you think using 150 g. and 174 g.? Getting say about 3000 f. seconds? I have a lot of No. 16, and must use it up—two years old. Of coure this applies to Nickle jacket bullets only, as I reload also with reduced loads. Is the Mark VII British shell (Spitzer) as accurate and powerful at long range as the famous Army Springfield? If not, why not? Why did Uncle Sam adopt the 45 auto.? Why not the Luger pistol, making it to 45 cal., and 230 g. bullet, also the famous Mauser automatic of like cal.? I have a 45 Gov. model auto Colt, but think the Mauser 7.63 m.m. and 9 mm. Luger far ahead in shooting qualities, excepting the punch of bullet. Just think of making the Luger and Mauser auto pistols with their present velocity into a 45 cal. and 230 g. bullet. What is the Government weight of powder behind a 230 g. bullet? I want the heaviest load of powder and weight of bullet possible. Don't mind recoil Was thinking of strengthening the recoil spring on my 45 auto to get a greater load than 6 grains of du Pont's No. 3 pistol powder as lisetd on powder can. I want absolutely the heaviest load and punch possible without hurting my gun. What do you think of this? I need protection running into bears and cougers (mountain lions) while prospecting. What is the technical answer or riddle to me? Why do you Yanks and the Springfield beat the world in shooting? "All honor to you." The Britishers are hard to beat, only when aroused or hammered, if you like. I think the Britishers could beat you at shooting if both sides used one type of rifle. The Springfield or Lee-Enfield. Strongly believe you have the best Army rifle in the world, don't you think? Will be pleased indeed if you'll answer these questions. Am a pistol and rifle crank for many years. Can a Britisher obtain the Army Springfield (star-gauged military pattern)?

W. A. Vancouver, B. C.

Answer (by Maj. Whelen):

I have received your letter of May 18, relative to the accuracy of your light Lee-Enfield rifle. Other things being equal, the accuracy of a rifle depends greatly upon the weight of the barrel. Probably the British War Office would not have approved this type of carbine for issue had not exhaustive tests shown it to be accurate. It is probably chambered for the Mark VI cartridge using the 215 grain bullet, but it should do good work with the Mark VII cartridge using the 174 grain pointed bullet. The maximum velocities can be obtained safely in the .303 British cartridge only when the Ross rifle is used. The Lee-Enfield rifle should not be used with these maximum charges, or with any charge giving a breech pressure of over 43,000 lbs. per square inch. Under separate cover I am sending you a copy of "Cartridges and Loads," which gives charges of du Pont No. 16 for the .303 British cartridge, and shows the breech pressure given by each. Do not use loads giving pressure over 43,000 pounds in your rifle.

Moddite is a nitro-glycerine powder, a supposed improvement over Cordite. It is usually regarded as quite erosive. Du Pont No. 16 is a nitro-cellulose powder, and you will find it much less erosive than Moddite, giving a much longer life to your barrel.

The Mark VII British cartridge is not as accurate or as powerful as the .30 caliber model 1906 United States cartridge. That it is not as powerful is very evident. That it is not as accurate is because—first, the system of a soft bullet .0015" smaller than groove diameter of barrel does not give as good accuracy as a system of hard bullet .00025" larger than groove diameter of the barrel; and, second, because a rifle having a bolt with locking lugs at its rear end is never as accurate as a rifle having the locking lugs at the front end of the bolt.

RESIZING CASE NECKS

IN loading the Frankford Arsenal 170 grain flat base and boat tail bullets would greater accuracy be obtained by expanding the necks of the cases, than by simply using muzzle sizer and seating bullets friction tight.

I use Ideal tools and have expanding plugs 308-310-311.

In your reply will you please advise if you think neck of case should be expanded and size plug I should have.

Is there a difference in the H-48 and F. A. 70 primers or has the manufacture of the H-48 primer been discontinued.

I am thinking of getting a Winchester 5-A scope for my Springfield. Would the new pistol grip stock be of any advantage over the regular stock.

C. D. W., Louisville, Ky.

Answer (by Major Whelen):

It is better to first resize the neck of the cases and then to expand them with a properly sized expanding plug, thus you get your cases uniform. You might insert your .310 and .311 expanding plugs for lead alloy and gas checked bullets, but I would have a good machinist grind down your .308 expanding plug to .3065 and expand the resize cases to this diameter for use with Frankford Arsenal bullets.

The H-48 primer is obsolete and has not been made since 1917. Those made during the early part of 1917 were unreliable. The F. A. 70 primer is a more modern primer and very much better in every way.

It is very desirable in using a telescope to have a stock with as high a comb as possible. The new pistol grip stock has a much higher comb than the regular stock and is much more desirable from all points of view, but particularly so from the telescope.

EROSION

I HAVE been experiencing considerable trouble through corrosion in the chamber near the front of one of my best rifles, 30-06 Springfield.

What would you recommend to remedy this? Would it be safe to remove the marks caused by pitting? As I have taken it in time and it is not very deep, but sufficient to show in examining the chamber, would it be safe to remove this entirely?

The barrel is in perfect condition and the fault may have been caused by leakage with using ammonia solution, although I have endeavored to give the rifle the best of care, with this exception.

H. B., Edmonton, Alta.

Answered (by Maj. Whelen):

If I knew what kind of ammunition you have been using I might be able to tell you with some degree of certainty what was the cause of corrosion in the bore of your rifle. When ammunition loaded with HiVel or Cordite powder (both of which are nitro-glycerine powders) is used a typical black erosion ring will appear in the throat of the bore after firing from 800 to 1,000 rounds. The throat is that portion of the bore where the lands taper to meet the chamber, and is the bullet seat just in front of the mouth of the case. Usually this causes the rifleman the utmost concern, but practically, while this erosion looks bad, the barrel will continue to give fine accuracy for about 2,000 rounds more—3,000 rounds in all. This is erosion from the hot powder gases, not corrosion.

On the other hand there is no reason why there should be any noticeable erosion or corrosion in the bore when nitrocellulose powders have been used, certainly not until three or four thousand rounds have been fired. If you have been using this kind of powder then I think that your trouble is probably due to some error in your method of cleaning, or some mistake or omission you made at some time. Under separate cover I am sending you a copy of "Cleaning and Care of Modern Firearms," which will give you the latest information on this subject. If one cleans the bore from the muzzle he is very liable to neglect the proper cleaning of the chamber, and particles of corrosive matter are liable to lodge therein. In using the standard metal fouling solution one is liable to have a little corrosion form if his solution is not right. If the solution is old the ammonium carbonate gradually evaporates and the resulting solution, too strong in persulphate, may cause rust. Solution should be kept in a cool place, and should be thrown away after it has remained mixed for a month. Even the new solution, if it is permitted to evaporate on steel, will cause rust. The keynote in using this new solution is to have it freshly mixed, to keep the steel continuously wet with it for not over 30 minutes, and then at once to thoroughly remove it from the steel so that no trace remains to evaporate and cause rust. Thus the cause may have been improperly mixed solution, solution deteriorated through age, or solution allowed to evaporate and dry in the chamber.

To remove as much as possible of this corrosion I would use a brass wire bristle brush and Winchester Rust Remover. I think probably one of your sporting goods stores handles these. Scratch with the brass brush about 15 seconds, then polish with rust remover on flannel patches about five minutes. Again repeat this treatment once only. Then clean out thoroughly, dry, and oil. After that forget the corrosion. It do not believe it will cause any trouble at all.

THE .38 SPECIAL LOAD

WOULD you kindly give me what you think is the best reload for the .38 S. & W. Special Revolver Cartridge, the kind of powder and amount, also the bullet mixture and the kind of primer.

J. G. W., Dunkirk, N. Y.

Answer (by Major Hatcher):

The standard load for the .38 Special is the 158 grain bullet and a charge of three and three-tenths (3.3) grains Bullseye powder, or three and eight-tenths (3.8) grains Du Pont Pistol Powder No. 5. The Modern Bond Co., of Wilmington, Del., makes a mould for this bullet, Bond No. B-358742.

Use a bullet mixture of one part tin to twenty parts lead. Suitable primers for this cartridge are Western No. 1½ S, Winchester No. 1½ W, Remington No. 6, Peters No. 1½, or U. S. No. 1½ Monogram.

THE 22-45

A YEAR ago, I think, I read in your magazine about there being hopes of the 45 service pistol being fixed to shoot the 22 cal. long range rifle cartridges.

I will appreciate your telling me when such a gun will be available for the civilian and what you think the price will be.

B. S. C., Watertown, N. Y.

Answer (by Major Hatcher):

Since the first description of the .22/.45 was published, the device has been tested out, and a number of improvements suggested. The original models were redesigned to embody the improvements and are now being tested by the Army. Until the test is completed, it cannot be known whether or not the device will be made for general use, or what the cost will be. I regret that your question cannot be answered more definitely.

Come Prepared

Some one has predicted that there will be five thousand sportsmen at Camp Perry for the big matches between September 2nd and 28th. We hope we shall have the chance to welcome everyone of them at the Western tent on Commercial Row.

A couple of weeks at Perry is the perfect vacation for the gun lover. But just a suggestion—this year bring ALL of your guns. There will be plenty of time between matches for a lot of good sport on the revolver range and at the traps. This is a good chance to improve your all-around ability.

An ample stock of Western ammunition of all kinds will be on the grounds—the same good ammunition which last year helped Major Frazier win the All-around Championship and which broke eight world's records at 800, 900 and 1,000 yards.

You will be interested in many of the exclusive Western developments such as Lubaloy non-fouling bullet jacket metal, Boat-Tail and Open Point Expanding bullets, Marksman super-accurate 22's, and Super-X, the shotgun load with 20 yards more range. A card will bring complete information on any of them. Address Department 7.

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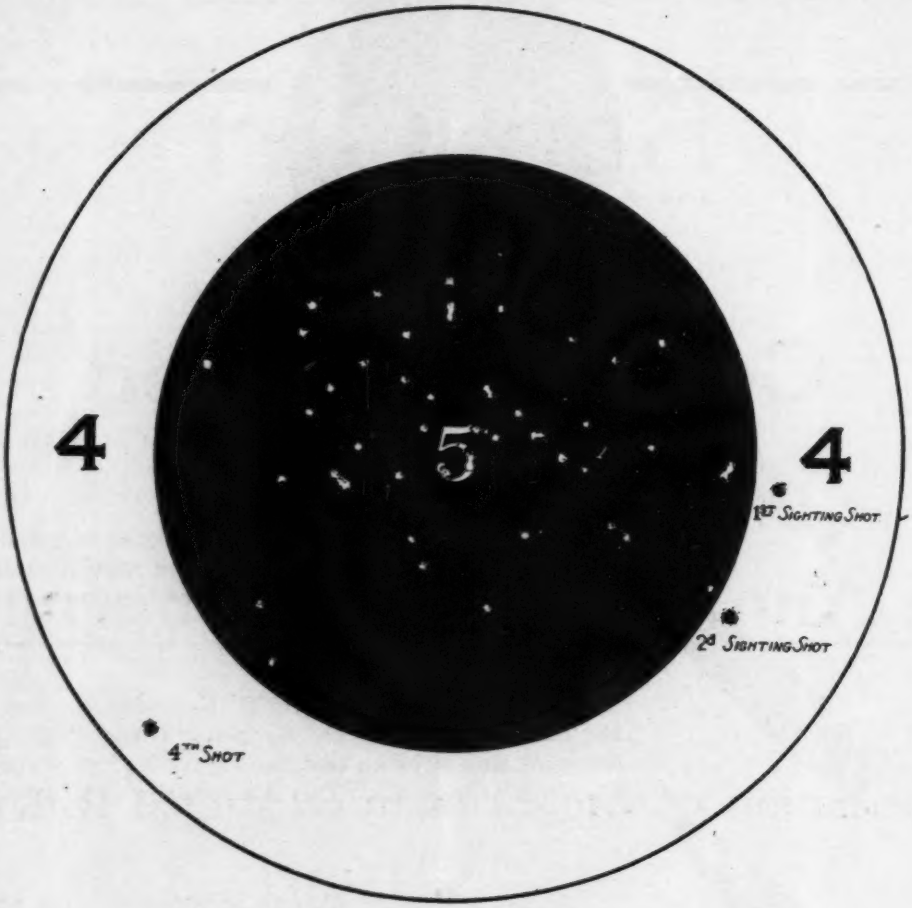

249 x 250 at 200 Yards with US .22 N.R.A. Cartridges

Here is a 50-shot group made with US .22 N. R. A. cartridges at 200 yards by Mr. E. B. Rice of the Mahwah (N. J.) Rifle Club, shooting a Pope barrel.

Of the 50 shots fired all but one hit the bull, 36 of them being within a radius of two inches of the center.

And remember—this target was made at 200 yards—the result proving the real accuracy and uniformity of US .22 N. R. A's.

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The use of any size or style of Peters cartridges, whether it be the small .22 Tack-Hole (both Outdoor and Indoor), the .38 S & W Special, the .45 Automatic, the .30 Springfield, etc., will produce results totally in keeping with the shooter's ability.

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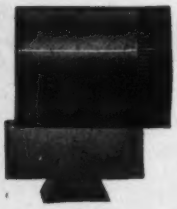

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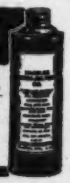

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Remington PALMA cartridges were the sensation of the meeting. They not only made the world's record but established new records in nearly all of the matches. A majority of the competitors as well as practically all of the prize winners used PALMA cartridges. The following are the matches won with PALMA Ammunition and the scores made by the winners:

SMALL BORE SPENCER (20 shots at 200 yards). Winner, Mr. C. S. Neary, possible score of 100 and 14 extra bulls-eyes. 3rd, Mr. D. Baker, 100 + 7; 4th, Mr. R. H. McGarity, 100 + 7; 5th, Capt. Roy L. Bowlin, 100. Six of the first 10 competitors in this match and 10 of the first 17 prize winners shot PALMA. The winner established a new record for the match.

TWO MAN TEAM MATCH (20 shots each at 100 and 200 yards). Mr. L. J. Corsa not only scored a possible at 100 yards in this match, but made the high individual score for the winning team shooting PALMA. There were four possibles at 100 yards in this match and two of these were made with PALMA.

EASTERN SMALL BORE INDIVIDUAL CHAMPIONSHIP (10 shots at 50, 100 and 200 yards). Won by Mr. O. W. Webster of Wilmington, Del., with a score of 247 x 250 shooting PALMA. Seven of the first 10 competitors and prize winners in this match shot PALMA. Two of the three possibles at 50 yards were made by competitors shooting PALMA.

PALMA SMALL BORE INDIVIDUAL MATCH (2 sighters and 15 for record at 150, 175 and 200 yards). Mr. C. S. Neary of the Remington Rifle Team scored 223 x 225 winning second place. Nine of the first 20 prize winners shot Remington PALMA.

EASTERN SMALL BORE TEAM CHAMPIONSHIP (10 shots each at 50, 100 and 200 yards). Won by the Mahwah Rifle Club with a record score of 976. The highest score for the team and for the match was made by Mr. L. J. Corsa, who tied the record of 247 x 250 for this course.

INDIVIDUAL GRAND AGGREGATE. Won by Mr. R. H.McGarity, Washington, D. C., with a score of 563 out of a possible 575. The aggregate and the scores made by Mr. McGarity consists of the following: Eastern Individual, 242; PALMA Individual, 221; Small Bore Spencer, 100. Total, 563. Mr. McGarity shot PALMA. Twenty-eight of the 52 competitors in the Grand Aggregate shot PALMA.

PALMA SMALL BORE TEAM MATCH (2 sighters and 15 for record at 150, 175 and 200 yards). Won by Frankford Arsenal Rifle Club with a record score of 888. The high pair on the winning team—Mr. Charles S. Hoag and Capt. Roy L. Bowlin with 221 and 224 respectively—shot PALMA. The Remington Rifle Team won 3rd place shooting PALMA and it was in this match that Capt. H. J. Wood made the world's record with a score of 225 x 225 with 50 consecutive bulls-eyes.

MATCH A, Re-entry 50 yards. High aggregate, Mr. L. J. Miller, score 994 x 1000. Seven of the first 10 competitors and prize winners in this match shot PALMA.

MATCH C, Re-entry 100 yards. Won by Mr. J. A. Wilmer, Philadelphia, Pa., scored 296 x 300 (iron sights). Eight of the first 12 prize winners in this match shot PALMA.

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22 LONG RIFLE
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MATCH E, Re-entry 200 yards. Won by Mr. Donald Baker, 150 x 150.

High Aggregate, Mr. Donald Baker shooting PALMA. Eleven of the 17 prize winners in this match shot PALMA.

MATCH F, Moose Match 50 yards. Won by Mr. J. A. Wilmer, score 78 x 100, shooting PALMA. Ten of the 15 prize winners in this match shot PALMA.

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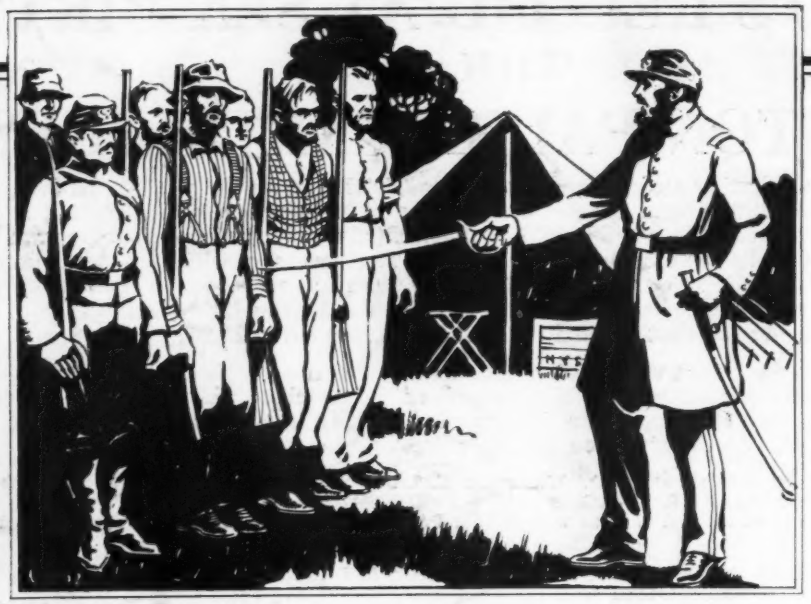

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